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GAS JOURNAL

LIGHT ✦ HEAT ✦ POWER ✦ BYE-PRODUCTS

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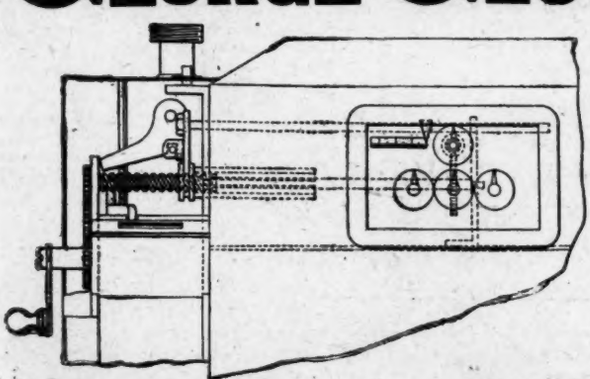

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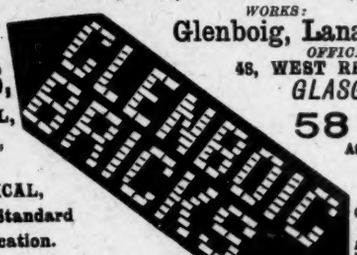

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VOL. CXLIII., No. 2884] TUESDAY, AUGUST 20, 1918. [70TH YEAR.

EDITORIAL NOTES.

The Suggested Inquiry into the Position of the Gas Industry.

THE title of the Statutory Undertakings (Temporary Increase of Charges) Act fully describes its purpose and its transient character. It is only a temporary measure, and does not in any way deal with the permanently changed economic conditions of the gas industry, about which we have had so much to say of late. In his address to the proprietors of the Commercial Gas Company, the Chairman (Mr. W. G. Bradshaw) stated that it is clear that the situation of gas undertakings cannot remain as at present. It must be reviewed and dealt with in a proper and wiser spirit. This is precisely what many men think; and, not only in regard to finance, but, as has been shown in our articles, many other matters. One authority in gas-works affairs said, in private conversation a few days ago, that the "JOURNAL" had never taken up a better cause than this, and at a more appropriate time; and this reflects the opinion of many. So far as finance is concerned, the President of the Board of Trade (Sir Albert Stanley), it has been seen from one of his speeches in the House, agrees that revision of conditions will be necessary after the war. But there are many other questions upon which to set to work, and from and upon which to formulate a clearly defined policy for the industry, in relation to both internal and external affairs; and this will pave the way to a better understanding of the requisite financial overhauling that is necessary. A thoroughly complete job must be made of the reorganization, reconstruction, or whatever else one chooses to call it, of the industry. It is a piece of work of an extent and importance that is worthy of a Committee specially appointed and of competent constitution to handle it, just as has been accorded to the electricity industry. The President of the Board of Trade is aware of the movement; but we should hardly imagine that anything can or will be done in the matter during the adjournment of Parliament, and during the absence of interested men on pressing business for the country, or on well-earned holidays.

The Coal Situation and Rationing.

FULLY conscious are we of the critical position in which coal supplies stand, and as to what has to be done by this country not only for itself, but for the allied nations, and not only in regard to the supply of coal, but of materials for the making of explosives, &c.—a point which the Coal Controller (Sir Guy Calthrop) overlooks, or does not conspicuously mention, when publicly arguing the necessity for coal economy. Being conscious of these things, all the more need do we see for criticism. During the past week, the organs of public information have, under the inspiration of Sir Guy, had much to say as to the seriousness of the coal outlook. This is quite proper; and we hope it will bear good fruit. The same papers have published statements to the effect that gas companies are "clamouring" for coal, owing to the depletion of their stocks. But the public have little enough knowledge as to what this all means, not only to them, but to the country and the war. In war, it is always better to have a good margin of necessaries than a poor one, or only sufficient to go on from hand to mouth; for, as events have shown, the fortunes of war vary enormously. In view of this, the only conclusion to be arrived at is that, in respect of coal, someone has blundered over the estimate of possibilities, and, coal being (as Sir Guy has told the public through the Daily Press) so important to the war, that the methods of procedure have been of a mistaken order, seeing that they have not provided for an increased production of coal as the war intensified, and its distribution in needful quantities to quarters essential to the war. Intensified war, yet reduction of coal supplies, and of the means of distributing them! That, in brief, is the position. Coal control has to confess that it has not kept pace with the materialization of possibilities; for every year the coal position has grown worse, instead of every year seeing improvements made to increase output and the power of distribution.

The Coal Controller may feel somewhat tired of hearing the complaints of the gas industry; but we must give him credit for appreciating the fact that the industry has right on its side. Every Government department concerned in the war presses the industry for a larger output of its own particular requirements, while the Coal Controller allocates less coal to gas undertakings, sends to them a goodly proportion of coal which has poor producing value, operates to reduce the consumption of gas, and thus causes by his successes a further increase of cost per 1000 c.ft. consumed. So the capacity and efficiency of the industry for supplying the requirements of the Ministry of Munitions, and through this Department the needs of the War Council and the Admiralty, are impaired to an alarming degree. Every half-yearly statement that now comes in from gas companies statistically announces that coal stocks (although this is summer time) have been depleted to a perilous extent; and those having the internal management of gas undertakings —"internal" for they have little to do with supplies of material or commercial work of any kind, seeing that they have been stripped of liberty by control—are looking forward with the deepest concern to the coming winter. To what extent in the aggregate the coal stocks of gas-works have been reduced below the normal is beyond ready computation; but the total, judging from the individual figures that are available, must be something enormous. And yet we are faced with smaller coal output, and less means of distribution and delivery than at any time during the period of the war. We have in the past four years, and have prided ourselves upon the fact, built-up big armies, big supplies of munitions, and increased the food yield of the homeland. During the same four years, we have let-down the means of supply and distribution of the primary essential, coal, upon which armies, munitions, and fertilizers so largely depend. When future generations read the history of these times, they will marvel over this condition.

If to the gas undertakings of the country disaster comes next winter (we are writing pointedly and seriously because the position fully warrants it), the responsibility will not be that of the gas undertakings themselves but of the Coal Control Department. This point was made by the Chairman of the South Metropolitan Gas Company (Mr. Charles Carpenter, D.Sc.) at the meeting of the proprietors last Wednesday; and we strongly advise not only those interested in gas supply undertakings, but the authorities in the various Government Departments concerned in the work of the industry, to read the part of Mr. Carpenter's speech treating of this matter, as also the illuminating but gravely disquieting figures quoted by Mr. W. G. Bradshaw at the meeting of the Commercial Gas Company. The revealed position is that of summer time, when everything is most conducive to the accumulation of stocks. This being so, what can be expected as the days shorten, and every condition becomes less favourable for stocking? Strong representations regarding the situation have been made to the authorities, but so far without any satisfactory result. If

there is a breakdown in the gas supply during the coming winter, the "clamour" now attributed to the gas companies will be shifted to the public. Depend upon it, the dissatisfaction and outcry will be loud if there is any interruption; and the public will not be easily satisfied that the utmost was done that could have been done to have averted such a catastrophe at a time when heat and light were most required. There is good cause to-day for everybody concerned—not only gas directors, committeemen, and engineers, but the public and Government Departments—to look on the coal position of gas undertakings throughout the United Kingdom with the utmost apprehension. We say United Kingdom, because, as will be seen from the address of the President of the Irish Gas Managers' Association (Mr. H. Kirkham), as well as other proceedings at the meeting of that body last week, the position in Ireland is severely critical.

Let us turn to the Fuel and Lighting Rationing scheme. In regard to it, as the Chairman of the South Metropolitan Gas Company says, gas companies cannot now be accused of being biassed, because, however threateningly disastrous may be the position of the coal supply to gas-works, and the effects of the rationing proposals upon the gas consumers financially and otherwise—financially because they inevitably mean a further addition to the price per 1000 c.ft. of gas—the companies are assured a minimum, if meagre, dividend. So we may proceed. Sir Guy Calthrop has told the newspapers of the intensely serious position of coal supply. We admit that it is the duty of everybody to economize to the utmost in his consumption of coal. While this is the duty of the public, it is also the duty of the Coal Controller himself to see that his own methods and prescriptions for economy are the best. Are they so from the thermal standpoint in connection with the allowance of 800 units of electricity per ton of coal, which, on the average consumption of coal at the generating stations in this country, require for their production about 1½ tons? Though he has done this, he tells housewives that he wishes them to use 25 p.ct. less coal than their rationed allowance. In urging this, why does not the Controller counsel housewives to accomplish what he desires by using gas instead of coal whenever and wherever opportunity may allow? for one of the greatest means of economy is in saving the stand-by coal consumption of kitchen ranges and of fires for room warming. The Coal Controller's plans should take the lines that will best serve his ends, and at the same time those of other Government Departments. But looking at the position in detail, and the relation that the various aspects of the matter bear one to the other, it is clear that the Coal Controller has not been well advised, or that he does not take the advice tendered to him, or that in the multitude of counsellors, each with his own end to serve, the Controller has been sadly let-down in his coal-economizing efforts.

If the position is "intensely serious" for next winter, why does not Sir Guy allocate the coal (to the maximum capacity of gas-works) in the way that will give the best efficiency in winter time in gaseous and solid fuel, and at the same time serve the purposes of other Government Departments, which the Coal Controller is indirectly rationing through household gas rationing and coal supply restrictions to gas-works. It follows that the more material gas-works can produce at home for the making of explosives to supply not only our Army and Navy but our Allies, the less will be the tonnage required to bring such materials over to this side from America. More than two years ago, the Chairman of the South Metropolitan Gas Company drew the attention of the authorities to the fact that Germany had ordered as much coal as possible to be retorted before use. The enemy knows which use of coal is the most profitable to the country, particularly in time of war. It is also known that the distribution of gas requires less labour than the vending of coal in small lots. Nevertheless, there is more solicitude over propitiating all the vendors of heating agents than over the utilization to the maximum degree of the services that will be of greatest utility to the country in this critical time. One would have thought, with Mr. Carpenter, that the use of gas in the circumstances of war would have been strongly encouraged, or the use of raw coal strongly discouraged. However, unless something drastic is done, the coming winter will be a perilous one for gas-works and for the greater part of the nation who are gas consumers. The coal position more than ever to-day requires handling in a sagacious manner, with the view of serving the largest interests of a nation at war. The public have often been asked by Sir Guy Calthrop to remember that the country is at war. We sometimes wonder, when we see the plans, commands, and operations of his department, whether the fact is always present in the minds of those who frame and issue them. If it is, then there are some things that are unaccountable.

A Word with the President of the Board of Trade.

Our gallant friend, Colonel William Thorne, M.P., who is so well known to our readers in connection with militant unionism, put a pertinent question to Sir Albert Stanley, the President of the Board of Trade, just before the members of the House of Commons parted for a little respite from legislative work. He pointed out that the various Departmental Committee reports on electricity supply that have been issued are tending to embarrass municipal authorities, because they do not know what line of action to take in regard to extensions of electricity plants in view of the fact that they are in the dark as to the intentions of the Government. So the information Colonel Thorne wanted was as to whether the President could make some announcement regarding the intentions of the Government. Sir Albert could not, though he admitted that the report of his own Committee is receiving careful attention. There is no need for municipal authorities to try to hurry up the matter on the ground of extensions, because materials, labour, and money are governing factors in this respect; and all three are too scarce under the prevailing war conditions for the Government to consent to any but extensions absolutely necessary for munition purposes. Furthermore, it may be that, since the Board of Trade Electricity Power Supply Committee reported, the President has learned that what is comprised in the report does not comprehend the whole position from the national standpoint. There are the questions of the Board of Fuel Research investigation and coal economy; and the Coal Controller has published figures which show that, from the thermal and certain other points of view, electricity undertakings cannot, as a whole, claim to be coal economizers, and that the ability to become maximum coal economists with efficiency and financial economy is not an inherent qualification, but must be sought for outside the electricity industry. He must, therefore, if duty is to be faithfully fulfilled without bias, consider the relation of the electricity scheme to other undertakings. He has also to be prepared to show Parliament why preferential consideration should be paid to the electricity industry in the matters of reforming parliamentary procedure and of according to it Government assistance in respect of finance on account of the extra costs imposed by the war. These are matters that will be challenged in Parliament; and Sir Albert may therefore think it worth while waiting until similar inquiries have been instituted and completed in respect of other industries to ascertain whether the scheme he has before him is not one that is altogether too confined, and not sufficiently far-reaching. It is not sound statesmanship to legislate for advantage in one quarter to the disparagement of interests in other quarters, unless some very strong reason for the preference can be shown. Impartiality is expected from our legislators; but can it be said that there is a shred of impartiality in the proposals of the Departmental Committee who have been considering and reporting upon electricity supply? We do not blame them for making large claims, and opening their mouths widely on behalf of electricity. But the President of the Board of Trade must—his high office and influence demand it—see that general interest is not sacrificed to selfish interest, and that there are not destructive motives or preferential consideration in the recommendations submitted to him. He can only do this by a sweeping investigation outside the limits of that already made.

Lessons from the Scientific Products Exhibition.

The British Scientific Products Exhibition which is now being held at King's College in the Strand, and on which an article appears in other pages, appeals at once to us as a remonstrance and an encouragement—a remonstrance that a country occupying the position of England has not hitherto made the greatest use of its resources by the united efforts of science and industry, and an encouragement in that necessity has forced the country to cater to a large extent for itself, and the success of it will induce greater and greater expansion, to the benefit of the country generally, and to the dismay of our Teutonic competitors, and former producers of much that we require. We are not of

those who think that any nation can either industrially or commercially do wholly without any other nation; but we are among those who believe in every country developing its own economic resources to the largest possible extent, and not allow others to prosper on our voluntarily imposed deficiencies and indifference. The influence and inspiration of this display at King's College of the development of a hitherto latent capacity should be excellent, though the exhibition is, for various reasons, merely typical and not comprehensive of wartime developments. Particularly we hope that our legislators will visit the exhibition, cogitate over what it means, and what lessons it may hold for them. If it should appeal to them for assistance for work that it represents (and secures it), it will have accomplished much. For industry cannot be developed without due encouragement. The leashes which at present confine industry will have to be loosened, and in some cases altogether removed; more will have to be done to provide technically educated men for industry; and our new industries and our fresh efforts will have to be protected from enemy country assailants, who immediately after the war will not be overscrupulous as to their methods of procedure to regain a footing and attain their ends. The war has shown us the manner of men with whom we have to deal; and against them we must guard ourselves in the time following the declaration of peace—peace only on the field, on the sea, and in the air.

A new kind of war will then start, in which the economic interests of the Allied nations will be severely attacked and subjected to heavy strain. Those of the gas industry will not escape molestation from enemy countries. If our legislators take count of how much there is in this exhibition that owes its origin and existence to the products derived from coal carbonization, they will see how necessary it is that the gas industry should be encouraged to produce every possible economy in connection with both its primary and secondary products. Elementary principles in industrial development ought to suggest to our legislators that the gas industry, by whatever means are most profitable, should develop its secondary products at the place of production, or as near thereto as possible, so as to deliver in more concentrated form than hitherto the materials for chemical manufacturers to use, to supply locally treated tar for road purposes, and to work up individually or in combination ammoniacal liquor, so as in every contributory way to economize—principally by avoiding the cost and labour involved in the carriage long distances of the crude secondary products. In this manner, the industry and the community would directly gain. Our legislators have proved by their actions and the imposition of disabilities that such simple lines of economic procedure have not been realized or have been overlooked by them. Glancing ahead, it is seen that the industry will require to gather together all the items of economy, be they small or large, that can be secured. Turn to the exhibition, and to the fertilizers shown. These will later on be coming into strong competition with sulphate of ammonia; and relative cost of production will be a determining factor of no mean importance. In this matter, what the Legislature has to consider is the line of action that will best serve the interests of the country, and not the line of action that will best serve the interests of individual chemical firms. The reverse has hitherto been the order of consideration. We therefore strongly advise our Legislators to visit the exhibition at King's College, and then pay heed to the direction in which what is to be seen there lays claim upon them for helpful action.

The Irish Gas Managers' Meeting.

Gas managers in this country are going through an unprecedentedly harassing time; but their *confrères* in Ireland are experiencing worse conditions. Their circumstances were never, generally speaking (except in the more prosperous towns), of a character highly contributory to success; but now they are experiencing the fury of war time in full blast. Their coal conditions are particularly bad; and they are ever moving for something better, with disappointing results. When they can get coal, they pay a price that puts into the shade what is paid on this side, and they have to resort to all sorts of expedients to keep supply and business afloat. It would not do in Ireland for the local authorities just now to be too severe in regard to gas standards; for it is in some places a question of getting what one can in the form of gas or going without. At the meeting of the Irish Gas Managers' Association last week, the proceedings throughout, from the address of the President (Mr. H. Kirkham, of New Ross) to the paper by Mr. R. Young, were alive with contemporary difficulties, and these difficulties do not appear to make less keen critics among the members. It would, however, be in better keeping with current conditions if more generous allowance were made by the members for the fact that there are differences in the grades of difficulties, and that therefore the subject of their criticism may be the result of something more abnormal than they themselves have experienced.

However, while the managers are taking steps to as far as possible ameliorate their current lot, they are not unmindful of the future. The President, for example, looks to the amalgamation of electricity with gas supply. This is a question that the gas industry has taken up late in the day. Where local conditions permit, it is a line of policy that should be pursued; for the established conditions of a gas-works—the war has added its proof—help to provide with the highest economy a supply of electricity, and the running of the additional business. Moreover, one's thoughts are being turned to producing gas in future of a different, but highly satisfactory, grade for the purposes to which gas is now being put; and Ireland like this country will not want to be behind the forward movement, for it is through this that added stability under new conditions will be given to the industry. Gas-works that also possess electricity supply will be in a strong position to advance in this direction. Those who do not must look to becoming linked-up with electricity supply by being able to furnish fuel, either in the form of gas or coke, for generating purposes. Openings for greater business development must be sought, and be catered for, by gas undertakings.

In this is one of the attractions of the paper by Mr. R. Young, of Parsonstown, and of the supplementary information given during the discussion by Mr. J. E. Enright. The paper treated of carburetted hydrogen plant; but it might be invested with the subsidiary title of "coal-economy plant." Mr. Young has had to resort to various expedients to maintain his gas supply during the war, owing to the absence of a sufficiency of coal; and through the plant he has found great coal economy, and has supplied people with what they want. Beside this outstanding fact, critical comment pales. He has used in the plant part cannel and part coal mixed with turf, and in some cases timber logs. He gives no information as to proportions and so forth. It would be of technical interest if working data could be put on record, and some particulars given as to the producing quality of the different materials. But the economy in coal has been wonderful; and the make of gas, according to the character of the materials used, has ranged from 24,000 to upwards of 30,000 c.ft. per ton of cannel or non-coking coal. It is clear the economy is not only in coal, but in labour. Some of the information missing from the paper will be found in Mr. Enright's account of his own experiences; and when one sees that, under present conditions, coal gas costs him into the holder 4s. 2⅓d. per 1000 c.ft., while his carburetted hydrogen gas costs 1s. 1½d. (using coke, and tar for enrichment), the figures do not strike one as—a member so described them—"alarming," but as alluring.

The Opposition to Relief.

May we suggest to the members of the London County Council, and the representatives of that body who gave evidence before the Select Committee of the House of Commons who considered the question of financial relief for gas undertakings, that they should read the remarks upon this subject of Mr. Charles Carpenter, D.Sc., at the meeting of the South Metropolitan Gas Company, and of Mr. W. G. Bradshaw at the meeting of the Commercial Gas Company. The proprietors of the Companies greeted with derision the ideas of the "representatives" of the public, as well as of Sir William Middlebrook's Committee, as to what constituted a sufficient measure of relief to maintain the stability and credit of gas undertakings; and their derision is accentuated by authoritative financial opinion in the City. What everybody who knows anything about finance, the needs for the maintenance of the integrity of a commercial enterprise, and the difference between right and wrong, justice and injustice, marvels at is that men holding such a position as representatives of the public in Parliament or in such a body as the London County Council could have been guilty of such folly as was seriously put forward and insisted upon in this instance. On the part of

the Committee, there was an attempt to please everybody, which resulted in an ignominious failure in respect of the most vital point. On the part of the County Council, there was an attempt to please the consumers even by the sacrifice of reputation for intelligent dealing, and of the consumers' interests by placing in jeopardy the credit of the supplying undertakings. Now people are laughing at the exhibition of crass stupidity.

The Miners and Increased Output.

Just recently strong efforts have been made by the Coal Controller and the Prime Minister, through the miners' organizations, to obtain increased output. The appeal has been made on the ground of what the "boys" are now doing at the Front, and that every ounce of coal that can be raised is helping to defeat the Germans. This is perfectly obvious; and the miners are realizing it. There are signs from various fields that they are going to respond; and that slackers are to have their conduct duly noted, and, if persisted in, action taken upon it. In some areas, Committees are being set up to inquire into cases of avoidable absenteeism, and absentees will have to explain, and show good cause for, their absence. If the explanation is not satisfactory, and wrong-doing continues, a place for such men, if of military age, should be at the Front. They are working in mines to do their duty; refusal to do it to the full should ensure their transference to another sphere of action. Those miners who want to help to win the war with pick and shovel or cutting-machine, and win it as quickly as possible, will have no desire to have as companions men who are shirking, and so aiding the enemy.

The Coal Merchants and Fuel Rationing.

Everybody for himself, so long as everybody is straight in the matter. We recommend to the Coal Controller and the Ministry of Munitions the attempt of a firm of coal merchants to induce householders to patronize, under the coal-rationing scheme, coal instead of gas or electricity, notwithstanding that the production of gas is necessary to the war. The firm in question bears the name of Cornwall; and Sir Edwin A. Cornwall is a member of the Government who exacts so much from gas undertakings, and gives so little in return. The circular states that the Coal Controller says that one ton of coal represents 15,000 c.ft. of gas or 800 units of electricity. The Coal Controller has not been guilty of any such absurdity. The 15,000 c.ft. and the 800 units of electricity are simply more or less arbitrary allowances that the Coal Controller has made per ton of crude coal that the householder can save from sacrifice on his domestic hearth. The circular gives the cost of 1 ton of coal as £2 5s.; 15,000 c.ft. at 4s. 6d. as £3 7s. 6d.; and 800 units of electricity at 4d. as £13 6s. It is added that "the most cheerful, healthy, and economical method of heating and cooking is, as it always has been—coal." The circular is silent on relative heating values, convenience, cleanliness, labour-saving, and absence with gas and electricity of the heavy bill for stand-by charges. A user of a coal fire would get a heat efficiency of about 20 p.ct., which would mean approximately 6 million B.Th.U. of the total heat value of the coal; but a coal fire when once lighted has to be kept going, in order to save labour, so that there is a big waste of money, which is not referred to in the coal merchants' letter. The modern gas-fire, on a consumption of 15,000 c.ft. with a heating efficiency of about 75 p.ct., will give, uniformly, useful heat to the room corresponding to the B.Th.U. of the ton of coal. In addition, labour is saved; there are no smoke, ashes, or dust, and the fire can be regulated at will. With electricity, even assuming 100 p.ct. efficiency (and no one with any intelligence would accept that) the 800 units would give 2,736,000 B.Th.U. In districts where the circular has appeared, gas undertakings should let householders know these facts, and not permit them to be misled through want of knowledge. The economy of gas over coal is well illustrated (though not under the best conditions for gas) in the address of Mr. H. Kirkham to the Irish Gas Managers' Association on Tuesday of last week [*ante*, p. 301].

Gas-Fires and Blankets and Quilts.

While the Ministry of Munitions are considering the efforts of the coal merchants to decrease the consumption of gas which is necessary to the maintenance of supplies of explosives materials for the war, they might also pay some attention to a cunningly worded advertisement that William M'Ilroy, Ltd., have inserted in the "Berkshire Chronicle," and which is distinctly intended to influence detrimentally the consumption of gas (beyond the curtailment that is rendered necessary by the coal position), in favour of the firm's blankets and quilts, the increased sale of which will do nothing to increase the supply of materials for the manufacture of explosives. "D.O.R.A." has taken notice of literature destined to prejudice recruiting; and if this advertisement is repeated, perhaps the Ministry of Munitions may see whether the Act cannot take into account actions that might (though there may be no intention in this direction) prejudice the means of providing explosives materials. The advertisement is headed "Bedroom Gas-Fires no Longer." Lower down it is stated that "gas-fires use too much gas to allow bedrooms to be heated by them this winter;" and this is followed by: "The only protection is more blankets and warm quilts." Is it necessary for the M'Ilroy blankets and quilts to be sold at the expense of national interests? We think not.

PERSONAL.

Mr. Alexander Mackie has been appointed Manager of the Bo'ness (N.B.) Gas Light Company, Ltd. He has been four years Manager at the Alva Gas-Works.

The name of Alderman William Kay, J.P., the Chairman of the Corporation Gas Department, is mentioned in connection with the Lord Mayoralty of Manchester.

Mr. Alexander Shepherd, who has been Acting Secretary to the St. Andrews Gas Company, is now appointed Secretary. He has been for many years in the service of the Company.

Lieut. C. T. Price, son of Mr. Thomas Price, the Engineer and Manager of the Walton-on-Thames Gas Company, who at the outbreak of war was an assistant to Mr. W. E. Price, of the Hampton Court Gas Company, has been awarded the Military Cross in Mesopotamia, for conspicuous gallantry and devotion to duty. He made valuable reconnaissance of the fords in the face of the enemy, and guided the battalion and led it across a ford covered by an enemy machine gun, until he himself was swept away by the current.

OBITUARY.

MR. WILLIAM WILLIAMS.

The shareholders of the European Gas Company have suffered a severe loss by the death last Wednesday of Mr. W. Williams, their Managing-Director. He was present at the annual meeting as recently as July 16; and then the Chairman (Mr. H. E. Jones) and the Deputy-Chairman (Mr. R. S. Gardiner) bore testimony to the loyalty of their colleague to the Company's affairs, which those who knew him intimately were aware was unlimited even in personal sacrifice. Mr. Williams entered the Company's service in January, 1878, under the direction of Mr. Henry M'Lauchlan Backler, who was then General Manager of the Company. An excellent judge of capacity, Mr. Backler speedily recognized the business keenness of Mr. Williams; and his thorough knowledge of French, and of the customs of the French people, marked him as one who was destined to occupy a prominent place in the future shaping of the Company's affairs. To the position of Secretary, he was appointed in July, 1885; and some seven years later—that is in December, 1892—saw him installed as their General Manager. On being offered a seat on the Board in April, 1910, he became Managing-Director; and it was in this capacity that, when the war broke out, he threw all his energies into helping to protect the Company's interests—realizing that for the stations there was a stiff and anxious time ahead. Largely through his instrumentality, the works were kept supplied with coal, partly by means of steamers purchased by the Company. Reserved as to his own doings, Mr. Williams was urbane to a degree; and any assistance within his power was extended to all who required it. He will be greatly missed not only by the London Board and staff and those with whom he was brought into business contact, but by all associated with the Company in France. A big-hearted man, the anxieties and sorrows in these war times of the Company's French officials and workmen were his anxieties and sorrows. They have lost one they counted as a friend in the very largest sense of the word. Since 1901, Mr. Williams had been a Director of the Oriental Gas Company; and the vacancy created on that Board cannot be filled by one who can prove by his best service a more conscientious devotion to duty. At the funeral, the Directors of the European Gas Company were represented by Mr. A. T. Eastman; and the staff by Messrs. W. B. Brady (Secretary) and Mr. P. J. Heather (the Chief Accountant). The Oriental Gas Company was represented by the Secretary (Mr. S. Rainer).

The Accrington District Gas and Water Board are nearing the selection of an Engineer and Manager of their gas and water undertakings, by further reducing the number of candidates from twelve to seven. Originally there were forty-three applicants.

NATIONAL GAS COUNCIL.

Statutory Undertakings (Temporary Increase of Charges) Bill.

The Executive Committee of the National Gas Council intimate that the above-named Bill, having now received the Royal assent, the Council are given to understand that the Board of Trade are prepared at once to receive applications for Orders granting relief in cases where the undertakers are qualified to apply under the Act.

Local authorities requiring an increase in the maximum price chargeable for gas, in order to enable the undertaking to be carried on without loss, and sliding-scale and maximum-dividend companies whose dividends have fallen below three-quarters of the standard or maximum rate of dividend, or below three-quarters of the pre-war dividend, whichever is the lower, should, it is pointed out, bring their cases before the Board of Trade without delay.

COAL CONSERVATION COMMITTEE'S REPORT.

The Ministry of Reconstruction will issue to-morrow (Wednesday) the final report of the Coal Conservation Committee which was appointed to consider and advise as to the improvements which can be effected: (1) In the mining of coal; (2) in the using of coal; and (3) as to the extension of coal supplies.

Five Sub-Section Committees were appointed to deal with different phases of these questions—namely, with mining method, power generation and transmission, metallurgy, carbonization, and geology. At a later date the Sub-Committees on Carbonization and Metallurgy were amalgamated. The reports of these various Sub-Committees have been approved and adopted by the main Committee; and they are to be published along with the final report, in the form of Appendices. The report of the Power Generation and Transmission Committee was published separately early this year; and its recommendation of a national scheme of electrical generation and transmission has attracted wide attention. This report is also to be reproduced in the final report which forms a comprehensive survey of the place of coal in the industries of the future.

Considerable attention has been given to the part which the carbonization of coal is calculated to play in reconstruction; and all known methods of preparation and treatment have received full examination. Steps are suggested not only for making more efficient use of the various grades of coal at present burned in a raw state, but also for putting to valuable use inferior coal, shale, and coal dust, now regarded as waste. Another matter of which the Committee emphasize the importance is the necessity of obtaining fuel oils, motor spirit, and the raw materials for explosives, drugs, and dyes. It is considered practically certain that larger supplies can be obtained from coal by the new methods of working which are proposed.

The Committee recommend the combined working in groups or units of coke-ovens, blast-furnaces, steel-furnaces, and rolling-mills—each unit to have a capacity of from 300,000 to 500,000 tons of finished steel per annum. One of the conditions of success will be the grouping of these united plants in suitable districts.

A definite conclusion has been reached regarding the production of electric power on a large scale; and it is felt that there is also a definite field for the use of gas-engines of the ordinary type. Research work is in progress with a view to forwarding the design and production of internal combustion engines. The necessity of replacing old with modern plant—especially in the smaller colliery undertakings—is pointed out as a further means of economizing in fuel.

The establishment of a Ministry of Mines and Minerals is recommended. It is proposed that, with certain exceptions, the various functions connected with the coal-mining industry, now vested in several Government Departments, shall either at once or after the war be transferred to a Ministry presided over by a Minister with a seat in Parliament. It appears that no fewer than seven Government Departments are now intimately concerned with mines and minerals.

It is pointed out that considerable possibilities in connection with the location of new coalfields, and the extension of those already being worked, lie within the scope of the geological survey now being made. It is possible, the report shows, that a large increase in our mineral wealth might be found were systematic exploration carried out by this body.

Rust Prevention.

An application of iron phosphates to the surface of iron and steel as a rust-preventive remedy (recommended for small machinery parts) is referred to in "Ice and Cold Storage." After a thorough steaming, the articles are immersed in a little bath containing ferric and ferrous phosphates, with a little manganese dioxide; and they are left at boiling-water temperature until hydrogen is no longer given off. The articles are then air-dried, when they may be treated with mineral oil, or painted, japanned, or otherwise finished. As the phosphate surface is attached chemically to the metal, no rust forms even in cracks in the paint.

BRITISH SCIENTIFIC PRODUCTS EXHIBITION.

A considerable part of King's College is being devoted, through the activity of the British Science Guild, to a purpose for which it was never designed, but a purpose which in no way assails the educational sanctity of the well-known buildings in the Strand, seeing that it is for public educational objects, and the advancement of the knowledge that this country holds latent possibilities of a remarkable order, if only it will put into operative action, and with an increased momentum as we progress, co-operation between science, industry, and labour. The building was not planned for exhibition purposes; but if one is diligent, there need be no regret over this, because the College forms a very appropriate setting to a display that is intended to illustrate—nothing more—something of what the forces of science, industry, and labour have accomplished conjunctively during the period of the war. The exhibition could do nothing more than this; for with all the influence of a wonderfully constituted Executive Committee, upon which such names as Sydenham, Lockyer, Redwood, Bell, Cockburn, Gregory, Avebury, Beilby, Cowan, Hadfield, Keogh, Magnus, Mond, Perkin, and others famed in different spheres appear, it was impossible to make the exhibition comprehensive owing to the numerical greatness of what, during the war, has been done that is new, to prohibition on account of the war, to the shortness of labour, and to the necessity for every one of some newly manufactured things being put to effective use rather than utilized to gratify public curiosity or stimulate public knowledge. But in the entrance hall, in the corridors (on ground and first floor), and in the class rooms and lecture halls branching therefrom, there are stored a rich illustration of the power of this country, in making itself more self-contained than heretofore. Our quiescent and amiable indifference to the commercial pre-war penetration of the Germans into our industrial and commercial life has been fortunately destroyed by the war; and in this exhibition is seen something more than the turning-point. It is the beginning of a new greatness in making ourselves more self-reliant, in extending our industries, and in enabling us to go into the outer world with new lines of manufacture. Could the German manufacturers who have hitherto enjoyed a large monopoly in many of these things, drop into the exhibition and see some—and only some—of the fruits of this new life, they would hate with unmitigated fervour those who began a war which had awakened slumbering Britishers into new ways and new activities. They would see, too, that this country could, when it willed, so organize its powers as to make itself an impenetrable obtacle to the industrial and commercial dominion which Germany was seeking to establish.

On Monday of last week, the members of the Circle of Scientific, Technical, and Trade Journalists had an opportunity of visiting King's College to obtain an early view of the scope of the exhibition, which (formally opened on Wednesday) will remain open to Sept. 7. They were headed by their Chairman (Mr. L. Gaster), and were received by Prof. R. A. Gregory, who is himself a member of the Circle, and who has been the mainspring in the organization of the exhibition. Among those present on the occasion was Sir Robert Hadfield, Bart., F.R.S., the ex-President of the Society of British Gas Industries.

An Address.

Prof. Gregory addressed those present; but we can only give a *résumé* of what he had to say:

Industrial advance seems to depend upon three main factors, in all of which brain and hand are related, though in different degrees. First, there is the creative investigator whose work reveals new properties and relationships; then comes the inventor or industrial researcher who seeks to apply knowledge to useful ends; and when a practical process or machine has been devised, the artisan is needed for its construction or technical use. All of these three classes have essential places in national life, and the correlation of their interests and activities should be the chief aim of statecraft.

It is not too much to say that since the advent of the war much more intelligent attention has been paid to this problem of effective co-ordination than was given in earlier years. The spirit of distrust which formerly existed between scientific workers and manufacturers has been largely dispelled, and an alliance is being formed which should go on increasing in strength for the benefit of each and the promotion of national prosperity. The man of science formerly confined himself too much to an academic atmosphere, and did not trouble to understand the problems of industry, while the manufacturer neglected to avail himself sufficiently of the potential industrial developments represented by the rich stores of scientific knowledge accumulated in the laboratory. During the last four years, however, science and industry have been brought into closer relationship, and some of the results of this *entente cordiale* are shown in the exhibition.

The aim of the exhibition is to stimulate public interest and confidence in the capacity of British Science, combined with industrial enterprise, to secure and maintain the leading place among progressive nations; and the object is the full development of our mental and material resources. It has been popularly assumed that original scientific work was almost a prerogative of Germany, whereas a slight acquaintance with scientific history would show that most modern industries have originated with British science and invention. In purely scientific research of initiative quality, we have always been the pioneers. Where we have been deficient is in the practical use of the results obtained, and the application of our natural scientific genius to the solution of industrial problems.

Under the stress of war, and protected from the dumping methods

which strangled promising industries almost at their birth, the opportunity has arisen of proving the latent capacities of many of our scientific industries. The story of what has been accomplished in several notable directions is told in articles contributed by competent authorities to the descriptive catalogue of the exhibition, and by the notes on the exhibits themselves. It is appropriate to mention in this place the work done by Sir Herbert Jackson, Professor of Chemistry in the College, to provide the chemical glass and optical glass urgently needed when supplies from Germany and Austria were cut off. Working with a Committee of the Institute of Chemistry, Sir Herbert Jackson determined the composition of numerous glasses required, and placed the formulæ freely at the disposal of manufacturers. The result was a reawakening of the glass industry in this country; and a position has now been secured which is strong enough to enable our manufacturers to meet all assaults upon it. The pure potash required for certain glasses is now obtained by a new electrolytic process; and we need never again go to Germany for it or for the glass itself.

Our chemical manufacturers are meeting all demands for such synthetic organic drugs as salicylic acid and aspirin, phenacetin, salvarsan, and many others, photographic chemicals, synthetic dyes, and associated products, as well as hundreds of similar substances of which Germany at one time had the monopoly. Thorium supplies, too, have been assured for this country. The Germans formerly controlled the supplies for 400 million gas mantles. But now the production has been developed in this country; and we shall be able to supply ourselves. The magneto industry has established itself in a sound position, and the German instrument has been displaced for good. Hard porcelain for electrical fittings and laboratory ware is now British-made, thanks to scientific work and industrial enterprise. We produce all the tungsten required for special steels and metallic filament lamps, and can supply the world if necessary. We make aluminium alloys superior to any of the German pre-war products, and like success has been attained in other directions.

While our military, naval, and air services have been actively engaged in battle, the allied forces of science and industry have been making advances no less noteworthy, though their conquests do not occupy much public attention. What has been achieved in scientific industry since the outbreak of hostilities is most creditable both to scientific workers and manufacturers; and the exhibition affords an object-lesson to the public as to their strength and adaptability. Much remains to be done before we can recover all the ground lost by inactivity and unwise Government; but by giving an indication of what has been accomplished during the last four years, the nation is provided with both a lesson from the past and a promise for the future, in which this country hopes to hold its own.

Among other of his points, Prof. Gregory was insistent upon the necessity for the provision of a greater number of highly trained technologists; and he indicated that in this matter the attraction for men must be the prospects that industry holds out in the way of remuneration. We agree whole-heartedly with Prof. Gregory in this, as we do also in his complaint that the Government of this country does comparatively little in relation to other countries in the way of financing technical education, upon which the industrial strength of the nation must in future so largely depend if we are going to wage an equal industrial and commercial rivalry with other nations. The new Education Bill wants supplementing in favour of a scientific and technical education. The United States has now some 40,000 students over eighteen years of age who will provide the country with scientifically trained technologists, and Germany has over 17,000. In this country, the last available returns only show some 5000 over sixteen years of age! This does not look well. In the States the technical colleges receive 7 millions a year from their Government; in this country, only half a million. This does not represent progress or proper provision on our part. We must have fully equipped captains of industry and technologists; and the Government must do its share.

Some of the Exhibitors and their Exhibits.

The exhibition is divided into fourteen sections; but not in all cases is there good grouping in respect of disposition so as to keep to a fairly well-defined classification. The numerous refined products derived from tar and other materials supplied by coal carbonization form a conspicuous part of the exhibition. In a very large measure, products have been chosen that are representative of the extension of our own industries into the domain of fine chemical manufacture which has been made during the war to meet the demand for products formerly obtained from Germany. Medicinal chemicals, antiseptics, dyes, &c., are there in sample form in wonderful profusion. Out of the large number, special attention is drawn to the exhibits of Messrs. Brotherton & Co., Ltd., Messrs. Brunner, Mond, & Co., Ltd., the British Cyanides Company, and Nitrogen Products and Carbide Company, Ltd. In the case of the second-named firm will be seen, among other products, ammonium nitrate produced from nitric acid made by the catalytic oxidation of ammonia, as well as ammonium nitrate produced by other methods. A specimen of pure trinitrotoluene will also be seen. The professional men of the gas industry will be interested in some of their future competitors in the fertilizing market; and more will be found in the exhibit of the Nitrogen Products and Carbide Company, Ltd. Specimens are there of things about which they have often previously read. There is nitric acid made by the Ostwald catalytic process, in which ammonia is oxidized with air. Ammonium nitrate is shown as made from nitric acid, and ammonia obtained from cyanamide. It is employed for making explosives, and is a concentrated nitrogenous fertilizer, containing 35 p.ct. nitrogen. Then there is the calcium cyanamide (nitrolim), containing 19 to 20 p.ct. nitrogen, and 30 p.ct. free lime. This is also used directly as a nitrogenous fertilizer. Then there is the granular nitrolim, containing 15 p.ct. nitrogen and 40 p.ct. slaked lime; one of its recommendations being that it supplies lime in addition to nitrogen. For the treatment particularly of acid and heavy soils, there is the bye-product carbonate of lime. Pitch, pitch coke, and light and fuel oils from pitch are among the other items. The Gas Light and Coke Company have a good display of their chemical manufactures. Dyes of many kinds have representation—several well-known firms showing samples. In passing, examination will be made of the exhibit of Sir William Crookes, where more fruits of patient effort in higher scientific research are seen. Samples are on view of the glass with which Sir William's name is associated, and which has the property of arresting both ultra-violet and heat radiations, which are especially valuable to those working by strong electric lights and high-temperature furnaces.

The chemical work connected with incandescent gas-mantles is not neglected. This country will not in future be content with dependence upon Germany for nitrate of thorium, as the London Thorium Company, Messrs. Curtis's and Harvey, and the Ramie Company, Ltd., demonstrate. The original minerals from which thorium is derived are to be seen—both Travancore and Brazilian Monazite sands and thorianite, as well as the chemicals extracted from the sand. These can be seen in case (in Section XII.) of the Ramie Company, who also show raw and prepared ramie fibre away to the finished product, and ultimately the completed "Zeimar" mantles coated with collodion. In the subsequent section—"Physical Appliances"—can be inspected some specimens of the Bland Light Syndicate's burners, mantles, and other productions. In the Glass, Quartz, Refractories, and Porcelain Section, we come across Messrs. Chance Bros., Ltd., who, in addition to wonderful optical glass, show heat-resisting glass globes and cylinders for high and low pressure incandescent gas-lamps. Mantle rings, which were made almost exclusively in Germany before the war, are now manufactured by Messrs. W. A. Ward & Co., of Nottingham, as samples testify. The Thermal Syndicate, Ltd., are showing their "Vitreosil," which has great virtue as a high-temperature resisting material, and is used among other applications for globes and cylinders for both high and low pressure gas-lamps, and in Messrs. G. Hands & Co.'s gas-fires, with their well-known tubular fronts.

Hadfield's, Ltd., come into three different sections. They are tremendous users, as Sir Robert told us in his address to the Society of British Gas Industries, of gas and electricity in the making of steel shells and many other productions important to war and peace. In these days of war, visitors will stop to inspect, and will be educated by, certain of their exhibits. Among those of the firm's research department will be seen a large temperature chart, ranging from absolute zero to the temperature of the sun, and showing the principal metallurgical temperatures based on the latest available data. Some information will also be obtained from the display by Thermit, Ltd., of their system of welding.

In Section II.—Physical Appliances—interest will be found in the electric-furnaces. Messrs. Fletcher, Russell, & Co. and the Davis Furnace Company keep the gas side up among small gas-furnace work. Also the Richmond Gas Stove and Meter Company, who are put in the Glass, Quartz, and Refractories Section (V.), possibly because among other things they are showing drawings of glass annealing and melting furnaces, as well as other specimens of their smaller productions which have fitness in such an exhibition. The Davis Gas-Stove Company likewise find place in the Food Production and Conservation Section (XIII.), with their fruit and vegetable evaporator. This is a patent gas-heated cabinet stove for the effective drying of fresh fruit and garden produce for storage in a dried state and after-season use. The Optical Pyrometer Syndicate are showing samples of their useful productions for those who deal with furnace temperatures.

Section III. is devoted to Electrical and Electro-Magnetic Appliances; and among the considerable collection of appliances samples of electric welding are to be seen. Messrs. Everett, Edgcumbe, & Co., Ltd., are showing the Trotter "Universal" photometer and the "Luxometer" portable photometer.

In Section IV., Tintometer, Limited, are showing Lovibond's chromo pyrometer, which is a direct vision apparatus; the correlation of the colour scales with incandescent temperatures being represented by colour curves. There is also a simple form of tintometer with a set of standard colours for the qualitative and quantitative colour measurements of all gases, liquids, and solids.

Gas Traction Section.

We must pass over the other sections which have great genera interest, but not that intimate association with the gas industry which justifies notice of the exhibits in these columns. In conclusion, an imposing section is that showing the progress made in gas traction. The section has been arranged by the Gas Traction Committee, under the direction of its Chairman, Sir Boverton Redwood, Bart., and Secretary, Mr. E. S. Shrapnell-Smith, C.B.E. The Committee is an Inter-Departmental one, including representatives of the Home Office, the Board of Trade, the Local Government Board, the Ministry of Munitions, the Ministry of Reconstruction, and the Petroleum Executive, with additional technical representation. The section occupies the Professors' robing-room and part of the space in the entrance hall.

Considerable public interest is centered in the London General Omnibus Company's gas-propelled omnibus, which stands out prominently in the entrance hall. This vehicle is equipped with wire-wound metal cylinders, to hold gas at a working pressure

of 67 atmospheres, and represents the design which has been approved for the experimental running of twenty double-deck omnibuses in London. The main reducing-valve brings the pressure down to one pound on the square inch; the final reduction to practically atmospheric pressure being effected in a flexible bag on the top of the canopy. It is understood that the gas-equipped vehicles, as they will appear in service, will present practically no external features to differentiate them from the ordinary petrol-driven omnibuses.

The Professors' robing-room has as its central exhibit the latest form of Torkington semi-rigid container. This is made of steel-wire fabric, intercoiled spirally, secured at the ends by swaging and passing through a steel retaining-ring—the end being enlarged by leaden wedges. The inner container is an ordinary rubber bag, or gas-tight tube, covered with felt. The British Automobile Traction Company send a model of their composite container, from the workshops of the East Kent Road Car Company, Canterbury, with the lower box-portion made of boards lined with fabric to render it gas-tight, and a collapsible top portion of fabric attached to the lining of the box. Flexible containers are shown in model form by the British Rubber Manufactures, Ltd., and the Ernest Lyon Gas-Equipment Company, Ltd., together with specimens of fabric and components. Various accessories and fittings include the Murphy gas carburettor and reducing-valve, the White and Poppe gas carburettor, and the Flugel combined gas-and-air control. Messrs. Flugel & Co., Ltd., have a specimen chassis outside the building, showing their high-pressure fittings and equipment. These comprise: (1) A gas carburettor, with air and gas valves, actuated by one positive control. (2) A combined reducing-valve and expansion chamber, to effect the reduction of pressure from (say) 120 atmospheres to 1 atmosphere, working in conjunction with an adjustable valve to effect the further reduction of pressure as required. (3) A specimen steel cylinder holding approximately 0·5 c.ft. at atmospheric pressure. The exhibit represents the equipment which has been approved by the Gas Traction Committee in respect of the commercial scale use of twenty goods carrying vehicles in London. An automatic cut-off valve, from the shops of the United Automobile Services, Bishop Auckland, is shown, the object of which device is to prevent the over-charging of any flexible container.

For measuring gas, the Rotary Meter Company are showing one of their meters, which requires the minimum of rationed metal, and which has been officially stamped as a correct measure under the Sale of Gas Act. The meter, which renders impossible the delivery of gas which is not registered, is constructed so that gas cannot be obtained at a lower rate than one-tenth of the rated capacity. A valve in the meter automatically closes if the flow of gas falls below this minimum, and requires to be mechanically operated before gas can be again obtained. The capacity of the meter is 6000 c.ft. per hour. Messrs. W. Parkinson & Co. show a hand-operated gas-filling recorder, specially constructed on the positive principle, for filling flexible containers. One turn of the handle delivers 1 c.ft. of gas; and it is convenient by this means to effect a charge of 600 c.ft. in ten minutes. The recorder is fitted with standard 2½-in. connections, and with an index to record the amount of gas supplied. The meter may be proved by any visitor; the medium for the test being, of course, atmospheric air, and not gas.

The section is completed by the inclusion of a series of interesting photographs, depicting various types of gas-equipped vehicles, lent by the Temple Press, Ltd.

THE NITROGEN PROBLEM.

The Special Intelligence Branch of the Ministry of Munitions ask that an intimation may be made that they have arranged at King's College an exhibit which shows some of the results that have accrued from the research undertaken on the nitrogen problem. It takes the form of a unit plant for the oxidation of ammonia to oxides of nitrogen. This process was not in extended use outside Germany before the outbreak of war; but there is reason to believe that the Germans have relied on it very largely for their output of nitric acid for explosives, as well as in the manufacture of sulphuric acid by the chamber process, as a substitute for Chile nitrate, which (owing to our blockade) they have been unable to obtain. The method is now in use in this country; and several large firms—such as Brunner, Mond, and Co. and the United Alkali Company—are using apparatus very similar to that shown. The apparatus is on view continually during the period of the exhibition; and demonstrations will be given by an officer of the Munitions Inventions Department on Wednesdays, at 4.30 p.m.

New Discovery for Extracting Gas from Coke.

Under this heading, the "Board of Trade Journal" writes: According to the "Hamburgischer Correspondent," the Director of the municipal gas-works in Zerbst (Anhalt) is said to have discovered a method for extracting considerable quantities of gas from coke which has already passed through the gas-works. With the means employed up to the present, an appreciable amount of gas still remained in the coke which it was impossible to extract. One consequence of the discovery is that Zerbst has lately enjoyed better gas conditions than other towns. To exploit this new discovery, a company has been formed in Zerbst, with a capital of 100,000 marks, 10,000 marks of which have been taken over by the Administrative Board.

ELECTRICITY SUPPLY MEMORANDA.

THERE is a grave omission in the Statutory Undertakings (Temporary Increase of Charges) Act. The Board of Trade and Local Government Board have acquired the power in it to grant advances, by anything up to 50 p.ct., of the maximum charges of municipal electricity suppliers. This power ought to have been accompanied by an insistence that all municipal suppliers of electricity should charge prices that would yield a sufficiency of revenue to meet all obligations, so as not to dip into the pockets of the general ratepayers for the money to meet deficits. Also that no undertakings should have the power to apply to the relief of the rates money made over and above the ordinary financial obligations of a trading business. The appropriate Board may see that they do not grant increases that will allow this latter operation; but, through the absence of the former injunction as to making those pay for the electrical service who patronize it, a large number of undertakings in these times will not make application under the Act so long as they have the sorely tried pockets of the community generally (many of whom do not use electricity) upon which to fall back to maintain the financial equilibrium of the concern. They may get all the revenue they can up to the maximum price prescribed in Private Act or Order; and then, for the rest, the community may be robbed to any degree, in which case it means that the consumers are not paying the full current cost of the service rendered them. The immoral proceeding of making the non-consuming part of the community pay part of the cost of electricity supply to other people is very rife just now. The electrical news week by week is rich in illustration of this. Municipal concerns are plentiful that are making deficits, despite increases of price; and in the commercial competition with gas, this makes the gas undertakings (both private and municipal) show up much worse in the eyes of the consumers than the rate-aided electrical undertakings.

The Relief Bill and Rate-Aided Undertakings.

Undercharge through the Aid of the Rates.

In our last issue [p. 314], it was seen that Mr. C. F. Botley has called attention in local papers to the position at Hastings; and this is only one of a number of similar instances. The Gas Company have been reviled, and all manner of false and harsh things said about them in the local papers, because they have to increase their price to make both ends meet, and have now the opportunity of making an application for an Order which will, when it is required, permit them to charge sufficient to pay three-quarters of their meagre standard dividend, which an ungenerous Parliament thinks will prop-up the financial credit of the concern, but which business men know full well will have no such effect, fully compatible with the interests of the consumers. The deficiencies of the municipal electricity undertaking the past three years have been: 1915-16, £5786; 1916-17, £5258; 1917-18, £4628. These deficiencies have been compensated by appropriations from the general district rate. For the comparison to be on all-fours with the Gas Company, they ought to have been made up by the electricity consumers, and not the ratepayers generally. We do not know what are the existing charges for electricity at Hastings; but if the ordinary lighting price per unit is up to the maximum, it will now be quite a simple matter for the Corporation to go to the Local Government Board for power to charge more, so as to enable their at present financially rotten electrical tub to stand firmly on its own bottom, without being propped-up by the ratepayers, who, as a body, are paying quite enough for the public lighting service, and getting very little value for their money.

Nottingham and the Big Midlands Scheme.

When one remembers Prof. Armstrong's violent attack on the backwardness of the Nottingham Corporation electricity undertaking in the matter of economic working, it strikes one as rather amusing that the Corporation should be arrogating to themselves leadership in pushing a big electrical scheme for Nottingham and forty miles around, on the ground that Nottingham has been endowed by Nature with wonderfully fine fuel resources for making a success of such a scheme. Considering the points that the Corporation Committee have put forward [see "Memoranda" for July 30], one marvels that the Corporation have all these years been blind to them, and have only just awakened to the fact that they might long ago have been pioneers in the reformed methods of electricity supply that have recently been rediscovered, although there are eminent engineers who claim that there is nothing in them more than can be accomplished by a well-equipped electricity station serving a smaller area. If these engineers are right, then it is a case with Nottingham of the blind trying to lead the blind. A correspondent of the "Electrical Review" puts the wise question why the most antiquated and inefficient station in the Midlands should suddenly think itself sufficiently capable and experienced to be able to design, equip, and run a national super-power house, and supply the surrounding towns and cities that can now generally boast higher efficiencies and lower costs? The writer gives the electrical records of nine towns that Nottingham proposes to absorb. The number of

units generated by Nottingham is the highest of the lot. In works' costs, however, six of the towns are lower than Nottingham. The cost of coal per unit is at Nottingham 0·62d., notwithstanding the boasted availability of fuel to the station. The average price obtained per unit—1·85d.—is the highest but one. The number of units sold per head of the population is 31; and there are only two towns lower. This year, the critic says, the concern has not managed to make both ends meet. Upon these disclosures as to the electrical character of Nottingham, the authorities will surely examine very closely their claims to be the primary custodians of an extensive scheme of the nature in view.

A Lost Opportunity in the South Suburban Company's Area.

Nothing is yet known as to the steps that will be taken by the Board of Trade respecting the proposals of the Electricity Sub-Committee of the Coal Conservation Committee as to the pre-carbonization of coal used for electricity generation. But Parliament has already shown a disinclination in connection with the Electrical Power Bills promoted this session to do anything in this direction—anyway, until it is more explicitly advised. The Board of Fuel Research in a preliminary report has given warning as to the danger of taking this step until there has been thorough investigation; for the carbonization of coal means the establishment of a complete new industry in connection with the electricity industry, while there are in existence huge industries with considerable capital in them, technical qualification, and readily adaptable resources that could be developed to supply the means of promoting economy, and realizing the additional products. As carbonizers and makers of multiform products from coal, gas undertakings ought, in the economic interests of the nation, to be permitted to develop their resources to the utmost pitch of perfection and utility. Any man who is not bound by precedent, bias, narrow notions, and a want of live conceptions, but who has proper mental equipment, must see the prudence of this course. But precedent, bias, narrow notions, and the absence of live conceptions, all blockade progress in this country even to-day to a degree that is perfectly astounding, while at the same time the talk grows in intensity as to national reconstruction, advance, economy, and efficiency. The South Suburban Gas Company offered a fine opportunity in their Bill this session to demonstrate, on a large working scale, what could be done in the matter of linking-up between gas and electricity suppliers, by the former furnishing to the latter heat units or electricity. But purblind authorities raised objections, and through their obstruction the clauses in the Company's Bill that would have given the needful power to make an advance were cut out. If we are to go on in this way, progress will never be made, and the country will remain chained to its old ways and disadvantages, to the benefit of more progressive nations who detect our deficiencies, and play upon them. Parliament should see to it that the days of obstructionists are ended; otherwise Parliament will have cause to rue its omission, and the nation the shortsightedness of Parliament.

Annihilation of Higher Plant Efficiency by Ash in Coal.

According to a report by the Acting Electrical Engineer of the Hull Corporation (Mr. J. F. Magoris), excessively dirty coal is not yet a thing of the past. In the gas industry, from here and there there have of late been reports of improvement; but this has a long way to go before it reaches the pre-war standard, which also could have been made better by the scientific treatment of coal. But this, of course, cannot be contemplated until after the war. According to Mr. Magoris, a sample of the coal recently allocated to his station by the Coal Controller contained no less than 30 p.ct. of incombustible matter, compared with about 8 to 10 p.ct. in the case of the pre-war deliveries. But the Corporation Electricity Committee have in their latest extensions adopted a high-duty pattern of automatic stoker, giving 33 p.ct. more efficiency than previous ones, and suited for a normal duty of 3 tons per hour. It will, however, be seen from this that the greater capacity of the stokers is almost entirely annihilated by the higher ash content of the coal. Just as this is the case with the stokers, so is the steam plant affected; and it follows that all through, whatever the character of the plant—gas plant or any other—the dirtier coal depreciates efficiency. Where, too, there is not automatic manipulation, there is a greatly increased call for labour. Large ash content in coal distributes waste wherever it goes.

Wartime Depreciation Allowance and Income-Tax.

A cognate subject is the depreciation of plant. Through the difficulties connected with materials and labour, and lessened upkeep, depreciation of plant is proceeding at a very alarming pace; and the old values allowed for depreciation no longer apply. Deferred repairs mean an accentuated rate of wear and tear; and the time will come when, in proportion to the old allowances for depreciation, more will have to be paid for renovation. We see that, "as the result of recent correspondence between the Inland Revenue authorities and the St. Pancras Electricity Committee, the allowance for wear and tear of the electricity generating plant and machinery has been increased from 5 to 7½ p.ct." The fact should be noted by the National Gas Council. Gas-works plant is suffering abnormal depreciation through the war; for it is impossible to maintain it, and so reduce depreciation, in the same way as under normal conditions. If the old depreciation allowance for income-tax deserves revision in the case of electricity plant, it does so in the case of gas-works plant.

READY RECKONER FOR THE RATIONING ORDER.

A USEFUL piece of work has been done by Mr. R. Angel, M.Inst. C.E., the Borough Engineer of Bermondsey, in connection with the Household Fuel and Lighting Order. It is a sort of ready reckoner in tabular form, and shows the amount of gas that may be consumed according to, by progressive stages of ¼ tons, the amount of coal relinquished by a householder in Northern Counties (denoted by "A") and in Southern Counties (denoted by "B"). The first column of the table indicates the number of rooms. The second column denotes the differences between the North and South of England in coal allowance. The third column denotes the scale allowance for gas for lighting and coal for the different sizes of houses. Then all the columns that follow show, by quarter-ton decreases in the quantity of coal, the amount of gas that may be consumed, including the lighting allowance. It would have enabled householders who do not know much about these things to have appreciated the figures better had the point been emphasized in some way or other as to the third column representing lighting gas in addition to coal, and that the lighting gas is included in all the subsequent figures. The table throughout is on the basis of 15,000 c.ft. of gas per ton of coal, *plus* lighting allowance; so that it will not meet the cases where variations from the standard gas allowance are permitted, on the ground of local conditions. In the case of electricity, workings are not made; but for every (or part of) 200 units required ¼ ton of coal must be deducted from the allowance, otherwise than in respect of the units consumed for lighting. It is a big piece of work that Mr. Angel has performed; every sized house up to twenty rooms has been treated; the twenty-roomed house, by ¼ ton progression, requiring no less than 66 columns to run out from 20 tons to 3½ tons for the North and 2½ tons for the South. By only using these amounts of coal out of the 20 tons for the North and 19 tons for the South, it is seen that the quantity of gas that may be consumed would be 277,500 c.ft. per annum (including lighting). The few calculations that we have checked have not disclosed an error. We are convinced the table will soon be found as a valuable assistant in all gas offices. The copy that we have seen is only an advance proof; but it is proposed to print the table on stout paper. It is published by the "Contract Journal," 127-130, Temple Chambers, Temple Avenue, E.C. 4.

Mineral Gas Industry.

Shortly before the war, mineral gas—according to the "Neue Zürcher Zeitung," quoted by the "Board of Trade Journal"—was discovered in Kissarmas, Hungary; and the possible yield was estimated at 250,000 million cb.m. But subsequent investigation tends to increase this estimate. The calorific value is 8000—equal to the best Cardiff coal; and the extraction necessitates relatively little labour. After the outbreak of war, the Government undertook the work of boring, and obtained some excellent results at Debrecyen and Keeskemet in Alföld, as also in North Croatia. It became necessary, however, to limit the enterprises to the Transylvanian mineral gas sources, as the metal industries were too much occupied with war work to supply the needful piping. The Hungarian Mineral Gas Company (with a capital of 27 million kronen, of which 4 millions are owned by the State), now provide several Transylvanian towns with gas, and also run a chlorine and a nitrogen factory. The Transylvanian Mineral Gas Company has set up factories for the production of ammonia, soda, chlorine, and cellulose. When exhausted of gas, the borings will remain valuable sources of mineral oils.

Germany's Monazite Sand Monopoly Gone.—Last Friday at King's College, Mr. Edmund White, lecturing at the British Scientific Products Exhibition, said that prior to the war a group of Germans had almost a monopoly of monazite—a mineral found in the sand of the seashore in certain parts of the world, from which is obtained thorium nitrate, a white salt which is absolutely essential in the manufacture of gas-mantles. It also produces a self-luminous compound for the making of watches and night compasses; and this, in view of the great rarity of radium, was of considerable importance. Up till 1905 monazite was found only in Norway, and cost £40 per lb. Large deposits of monazite sand were then found in Brazil; and Germany obtained from the Brazilian Government the sole right to remove it from the shore. Later a French company, working for jewels in Brazil, found monazite. Monazite was discovered in 1910 in Travancore, a native Indian State under British protection. Mr. White mentioned that in September, 1914, he obtained for his company the right to all the monazite in the privately-owned parts of the sea coast of Travancore. Germany had thus lost the dominion of the gas-mantle market; and she need never regain it, he said, if things were properly managed after the war. Mr. White observed that the world used something like 400 million gas-mantles annually.

COAL AND ITS SCIENTIFIC USES.*

THIS is a notable book of the year. Its objective is to direct the attention of the scientific public to the statistical, chemical, and technical aspect of the fuel question; and undoubtedly this has been attained. The importance of coal to the nation has been vividly brought to its notice by the Fuel Rationing Order; and the prospect of a coal-less spring will be an additional reminder. The book, therefore, appears opportunely.

As Livesey Professor of Coal Gas Industries at the University of Leeds, the author was invited in 1912 to come to the Imperial College of Science and Technology, London, to organize the Department of Chemical Technology, in which the subjects of fuel technology and chemical engineering are specially treated. At the first meeting of the British Association after the outbreak of war, Prof. Bone was President of the Chemical Section; and at the first meeting in 1915 at Manchester he drew attention to the need of a national policy with regard to fuel. As a result, the British Association appointed a Fuel Economy Committee which, under Prof. Bone's chairmanship, issued a very valuable review of the whole fuel situation of the country and empire. It was largely the pioneer work of this Committee which led to the Government appointing Lord Haldane's Coal Conservation Committee, now under the Ministry of Reconstruction (of which Prof. Bone was an active member), and later to the establishment of the Fuel Research Board under the Department of Scientific and Industrial Research, to which Prof. Bone was appointed consultant.

The introductory chapter of the book opens with a description of the national development under the ægis of apparently unlimited coal during the hundred years before 1850, and the supremacy of the mercantile marine since then, which has been chiefly supported by increasing exports of coal. The cheap production of coal, iron, and steel is closely bound up with the future maintenance of our marine supremacy. The problem is a purely economic one, requiring a zealous conservation of fuel, and cheap labour. Here the matter becomes complex, on account of the demands by labour for increased wages, while the output of coal per man is diminishing, the result of which is to enhance the price of coal and automatically that of iron and steel.

The available reserves of coal in Great Britain amount to approximately one-fortieth, while the whole Empire can only claim one-fourth of the world's estimated total. This calls for drastic economies in the near future. Undoubtedly the United States will be a close competitor of the Empire, with her estimated reserves of half the world's coal, whose quality and cost of production compares closely with Great Britain.

As to our coal reserves, we have in the past squandered them freely and blackened our towns; but the residue, with care, will last us for a period equal to that which has elapsed since the advent of the Black Prince. Obviously, we must conserve our supply; but experience has shown that the more economy that is practised in the use of coal, the more its consumption will increase! In spite of this postulate, it behoves us to utilize our raw material to the best advantage. The chemist has this task before him; for he will be able to solve the problem of "coal economy" by a suitable development of the valuable bye-products from coal, with consequent mitigation of the smoke pest, which is the cause of direct loss to the country—both in health and wealth.

Concerning the genesis of coal, the author states: "Among the parent substances in the organic *débris* from which coals have originated, we are chiefly concerned with the following three principal classes:

(*a*) Celluloses—*i.e.*, ligno-celluloses, essentially carbohydrates $n(C_{12}H_{18}O_9)$ of a cyclic type.
(*b*) Resinic—*i.e.*, gums, resins, and waxes, all of which are compounded of carbon, hydrogen, and oxygen, but may belong to many different chemical types.
(*c*) Nitrogenous—*i.e.*, proteid bodies, or compounds of carbon, hydrogen, oxygen, nitrogen, and sulphur.

These branches are, in turn, fully treated along with experimental data in a striking manner and with a simplicity of diction which will appeal to the general reader.

In investigating the nature of the coal substance, a solvent was sought which would dissolve out portions of the mass without in any way altering the chemical character of either the solution or the residue. Pyridine appeared to effect this purpose; and in the hands of Dr. R. V. Wheeler and his co-workers, who supplemented the extraction of the coal by subsequent chloroform extraction, a separation of the coal substance took place into what was recognized to be cellulosic and resenic constituents.

The author brings to bear some helpful constructive criticism on this work; for he is inclined to think, from his own experience of the action of solvents: "(1) That the method described by Wheeler does not effect quite so clear and complete a separation of the resinic and cellulosic constituents as he supposed; (2) that in applying it he did not sufficiently take into account the nitrogenous constituents of the coal; and (3) that the non-exclusion of oxygen in his experiments may have appreciably affected his results."

The action of basic solvents, the work of Fischer and Gluud using benzene under pressure, and of Pictet, Ramseyer, and Kaiser, are all fully reviewed with sufficient experimental detail to make this branch of the subject comprehensive.

Recently the low-temperature distillation of coal (between 400° and 600° C.), with a view to decomposing the smoke-producing portions of it, also obtaining fuel oils and motor spirit among other things, has attracted considerable attention.

Burgess and Wheeler describe, in great detail, the thermal decomposition of coal—dwelling particularly upon the volumes and composition of the gases evolved at progressively increasing temperatures, up to 1100° C. In the course of the work, Wheeler found a temperature between 700° and 800° C., at which the evolution of hydrogen rapidly increases. The interpretation of the facts thus arising at this point led to an interesting dispute between the English and American investigators.

Jones and Wheeler's work on the constitution of coal is summarized and considered by the author to be of considerable importance. An excellent grand summary of our knowledge regarding the chemical composition of coal concludes the chapter.

The subject is continued on what may be termed the pure chemical side, revealing the methods adopted to fathom the cause of the formation of aromatic hydrocarbons so important in the formation of dyestuffs and drugs. This work incidentally involves some of the author's own work upon the behaviour of the simpler hydrocarbons at temperatures between 500° and 1200° C., and its bearing on the secondary interaction occurring in the gas-retort. In the course of this work, the influence of surface on the hot interacting gases is pointed out. The author's words may profitably be quoted:

> The all-important influence of surface was strikingly demonstrated by two comparative experiments at 1015° to 1030°, the one with the reaction tube unpacked, in which 35 p.ct. of the original methane was decomposed in an hour, and the other with a packing of fragments of quicklime, in which no less than 96 p.ct. of the hydrocarbon disappeared within twenty-five minutes; while at the end of an hour, when final equilibrium had been established in the system, only about 1 p.ct. of it remained.

Here we have the nucleus of the discovery of surface combustion referred to later.

The weathering and spontaneous heating and ignition of coals and lignites when stored in bulk, has always been a serious concern in the coal pit, owing to the occurrence of "gob fires," and on ships carrying coal. Anthracites are little affected on storage; while bituminous coals deteriorate appreciably. Iron pyrites was formerly considered to be the substance that was responsible for spontaneous heating. The influence of pyrites is now held to be negligible in rendering a bituminous coal autogenous; and the cause is looked for in the character of the coal itself.

The combustion of coal is scientifically discussed, and leads to to a description of the methods adopted in the burning of fuel in boilers, with its consequent production of black smoke. The devices employed to diminish this are set out with many accompanying illustrations and diagrams. This branch of the work leads naturally to heat transmission in boilers, which is fully expounded.

A section of the book which at the moment should be of very considerable interest is that concerning domestic heating. The amount of coal consumed for domestic purposes in the United Kingdom is in the region of 36 million tons per annum, or nearly one-fifth of the total consumption for all purposes. War conditions necessitate considerable curtailment in domestic heating, and the consumer is faced with the problem of retrenchment. The British open fireplace and kitchen range are both exceedingly prodigal in their use of coal as can be seen by the fact that we consume 15 cwt. of coal per annum per head of the population, as against only 5 cwt. in Germany, where closed stoves are employed. A sum of £1 sterling can command:

(1)	In the form of coal	20,000,000	B.Th.U.
(2)	,, ,, gas	4,000,000	,,
(3)	,, ,, electricity . . .	825,000	,,

The percentage losses in the three cases may be considered as not less than 60 in the case of coal, about 20 in the case of gas, and not more than 10 in the case of electricity. Coal has a further set-back when used in the raw state; for it requires attention in the way of feeding the fire and in removing the soot and dust produced. There is thus considerable need of modifying the present design of coal grates in the direction of employing more fire-brick and less iron.

Now that the consumer is left to choose whether he will take his heat units in the form of coal or gas, the gas-fire may be viewed with less prejudice when it is realized what an efficient source of heat it has become. Much scientific effort has been brought to the development of gas heating, both in the way of devising sound methods for determining the radiant efficiency of gas-fires and constructing them in such a way as to give the maximum heat and ventilation per cubic foot of gas consumed. A gas-stove gives off no smoke, the author points out, and thus one of the greatest evils of our cities is avoided. The damage to property alone in London amounts to £4,000,000 annually; and in Manchester smoke is directly responsible for £1,000,000 loss on structures. This is, of course, quite apart from the loss of sunshine due to the contamination of the atmosphere—so baneful to the health of all those who are condemned to labour under its pall. We must look forward to the time when it will be realized

* "Coal and its Scientific Uses." By Professor William A. Bone, D.Sc., Ph.D., F.R.S. London: Longmans, Green, & Co.; 1918.

how barbarous a thing it is to use raw coal as a direct heating agent.

This consideration leads to the advantages to be obtained by the use of gaseous fuel. For industrial purposes gas is easy to control, and consumes little more than the required amount of air for its combustion. With surface combustion just the required amount of air is smokeless, and lends itself readily to "recuperative" or "regenerative" systems where high temperatures are to be economically maintained. The source of the gas supply may be either from the gas-works, the producer plant, from coke-ovens, or the blast furnace, or the two latter combined. The important factors to be considered are: (*a*) Density; (*b*) the range of explosibility; (*c*) flame temperature and combustion intensity; (*d*) the radiative power of the flame produced.

The subsection on "Limits of Inflammability and Rates of Flame Propagation" amplifies, and quite suitably, too, the main section on gas.

There is an ample epitome on the work of the carbonizing industries, and due prominence is given to the gas industry both on account of its main product and the equally valuable bye-products which constitute the raw materials for the manufacture of synthetic dyes, drugs, and (at present) high explosives. The coking industry forms a complementary section under the main head; and herein are amplified the many subsidiary uses to which the gas may be put after it has served to heat the ovens—viz., for steam raising, power production on the works themselves, or in rolling mills, and as a domestic supply of light and heat.

Producer gas, coupled with ammonia recovery, takes its place under the heading of the complete gasification of coal. The chemistry of the subject is attractively submitted to the reader along with the author's and Dr. Wheeler's investigations on the use of steam in gas-producer practice. Producer design receives its modicum of treatment along with the attendant group of power plants and suction producers. These sections are well illustrated with photographs and diagrams of plant. The author's concluding words on this section are well worthy of note: "So far as this country is concerned, there is perhaps no branch of fuel technology in which the substitution of scientific for rule-of-thumb methods would realize greater margins of improvement than in connection with the generation and application of producer gas for furnace purposes."

The chapter on "Fuel Economy in the Manufacture of Iron and Steel" is of great moment, because it is an authoritative statement based on years of first-hand experience gathered by the author from an intimate survey of the problems arising in one of the largest and most up-to-date works in the kingdom. The subject is of extreme importance on account of the close connection with the welfare and prestige of the country, whose prosperity is dependent on the cheap production of steel. Moreover, the large quantities of fuel consumed per annum in the iron and steel industries call for every care in its utilization; for if this is not attended to, the losses involved reach immense proportions, and add to the cost of the finished article. The cardinal feature is the concentration of bye-product coke-ovens, blast-furnaces, steel works, and rolling mills on one plant, coupled with the utmost utilization of the surplus blast-furnace and coke-oven gas for power and heating purposes.

There is little space left to adequately touch upon the power production branch of this book, with all its ramifications. But it is interesting to note a section devoted to the "North-East Coast Electric Power Scheme," which is claimed to be a practical example of fuel economy. It has an added interest; for it serves as an outline in actual being of the scheme now before the country to develop this side of the question for the wellbeing of industry and municipalities alike.

The concluding chapter, on surface combustion, brings this valuable work to a fitting close; for it forms a species of climax, in that it is the expression of a refinement of the highest order in the use of fuel.

Professor Bone's brilliant researches on hydrocarbon combustion, conducted over a period of fifteen years, was completed by the final fundamental investigations on gaseous combustion at high pressures—reviewed in the "Journal" for Jan. 18, 1916—instituted to meet and satisfy the demands of critics. In the course of these researches, and emanating from them, the discovery of the principle of surface combustion was made which led to its unique industrial application.

By a comparatively simple device, an explosive mixture of an inflammable gas with air in contact with a suitable "surface" will produce temperatures only controlled by the melting point of the refractory surface employed and without any appearance of flame. Nearly the whole of the calorific energy of the combustion is exerted in the form of radiant energy. Such catalytic combustion depends upon the intimate association of the surface with the combining gases. This surface action can be seen by an examination of micro-photographs of silver gauze before and after use. A surface possesses the power of accelerating combustion at temperatures slightly lower than the ignition point; and the same power would be more manifest at higher temperatures—more especially when the surface is radiating strongly. At bright incandescence, the author claims that all surfaces have approximately the same catalytic effect.

The practical development of this principle has attracted world-wide attention—particularly in America, where Prof. Bone was invited to lecture in many of the large cities. The achievement was signally appreciated in that the author was the recipient of the Howard Potts Gold Medal of the American Gas Institution, of which he is an honorary member.

In its industrial application, surface combustion lends itself to fuel economy in the truest sense, for the heat is concentrated where it is required. High temperatures are attainable without regenerative devices; and, on account of the large amount of radiant energy produced, transmission of heat from the source to the object to be heated is very rapid. This new principle is applied in the heating of crucibles and muffles, to the evaporation of silicate and sugar solutions, and to steam-raising in specially designed boilers which have proved to be the most efficient on the market.

Prof. Bone's treatise, so complete and adequate, is in no way a compilation, but a record of new and original work, submitted from the view-point of economics, with a wealth of mature and valuable experience behind it—thus making a splendid addition to the literature of reconstruction.

THE HOUSEHOLD FUEL AND LIGHTING ORDER, 1918.

By Thos. Newton.

The recent Household Fuel and Lighting Order may be defined as an example of panic legislation enshrined in a maze of words; and the twenty odd thousand words required by the Board of Trade to convey to a willing nation that it must save coal is a masterpiece of word-spinning. The scope of the Order is very comprehensive; and the powers vested in the Controller are very autocratic. But the Order is carelessly drawn, and bears internal evidence of a hasty attempt to reconcile the irreconcilable.

The inconsistencies and illogicalities strewn throughout the Order are patent to even the most casual observer; and the logic—whether from design or accident—always breaks down to the disadvantage of the gas industry, and in favour of the electrical industry. Preferential treatment for electrical consumers and industries is diligently, studiously, and even painfully preserved. Presumably, one of the chief reasons for the promulgation of the Order is the pressing necessity for obtaining every ounce of usefulness from every ton of coal. This being the case, wonder is expressed that gas undertakings and gas consumers should be penalized for assisting in this connection, in order that electrical undertakings and consumers of electricity may obtain preferential terms for acting otherwise.

To save coal and to convert it to the best possible use are laudable objects at any time; and at the present juncture these objects are of paramount importance. But unless the Order is drastically amended in several important details, it is extremely doubtful if the expectations of the Board of Trade concerning it will ever be realized without imposing great and unnecessary hardships upon large sections of the community.

Position of the Slot Consumer.

Take, for example, the case of the slot consumer living in a four-roomed house, and consuming 1000 c.ft. of gas per week. Under the terms of the Order, the fuel allowance is 4 tons 10 cwt., and the lighting allowance is 11,250 c.ft. per annum. Assuming that 1½ cwt. of coal per week are consumed—and this amount of fuel for such a house would represent a very fair average consumption, without waste—there only remains half-a-ton of fuel for the purpose of converting into gas, since (according to clause 7), "the quantity of fuel to be taken as gas must be calculated to the nearest quarter-of-a-ton." The slot consumer's position under the Order would be as follows:

Annual consumption at 1000 c.ft. per week	= 52,000 c.ft.
Lighting allowance . .	= 11,250 c.ft.
Conversion of ½ ton fuel at 15,000 c.ft per ton . .	= 7,500 c.ft.
	18,750 c.ft. = 18,750 c.ft.
Annual deficiency . . .	33,250 c.ft.

It will thus be readily understood that the absurdly low conversion factor of 15,000 c.ft. of gas per ton of coal will inflict exceptionally severe hardship on the slot consumer. Other consumers will be similarly penalized; and managers of gas undertakings can calculate for themselves the extent to which the output of gas throughout the country is likely to be restricted.

The working classes are the principal slot-consumers; and to-day they are dependent on the use of gas to a greater extent than ever before. Families are working on munitions and in kindred industries; and they rely on gas particularly for cooking. Oftentimes the housewife is compelled to cater for those working on two, and in some cases three, different shifts per day. This, of course, involves much labour; but the labour-saving gas-cooker makes the burden tolerable. Any restriction in the use of gas in this connection will impose unnecessary labour on those who are already occupied practically to the fullest possible extent; and the resultant waste in both labour and fuel will defeat the very object which the Controller has in view.

Conversion Factors.

It is difficult to appreciate the motives underlying the adoption of the various conversion factors mentioned in the Order. First,

15,000 c.ft. of gas are said to equal 1 ton of fuel; and 240 B.T.U. of electricity are given as the equivalent of 15,000 c.ft. of gas. But, instead of 240 B.T.U. of electricity equalling 1 ton of fuel (as one would logically suppose from the foregoing), the conversion factor of 800 B.T.U. is given. If, therefore, it be considered necessary to increase the number of B.T.U. of electricity for heating and cooking, what logical objection can be offered against similarly raising the number of cubic feet of gas for the same purpose? Why this perpetual preferential treatment of electricity? As 800 equals three-and-a-third times 240, equality of treatment demands that 15,000 should also be multiplied by $3\frac{1}{3}$ to give a conversion factor of 50,000 c.ft. of gas per ton of coal. The equivalents would then be as follows:

Lighting.				Heating.		
Electricity. (B.T.U.)		Gas. (C.Ft.)		Electricity. (B.T.U.)		Gas. (C.Ft.)
240	=	15,000	....	800	=	50,000

As, however, different conversion factors for lighting and heating would involve unnecessary expense and labour in supplying and fixing separate meters, the lighting factor might very well be eliminated in favour of the adoption of the heating factor. If it be contended that 50,000 c.ft. of gas cannot be conceded as the equivalent of 1 ton of fuel, neither should 800 B.T.U. of electricity be allowed.

Reserves of Coal.

Clause 102 states: "An undertaker of gas or electricity supply shall maintain such reserves of coal for the purposes of its undertaking as the Controller may determine, and shall report to the Local Fuel Overseer or Overseers concerned, and to the Controller, any failure on its part to maintain such reserves." If the maintenance of the necessary reserves of coal is simply a matter of what the Controller may determine, all that can be said is that the Controller's determination up to date has not greatly benefited the gas industry; and if the position of affairs as regards reserves of coal were not so serious, such clauses as the above would be mirth-provoking in the extreme. What is the good of reporting to subordinates when urgent reports and frantic appeals to the Controller are daily occurrences? If the Controller is really anxious about gas-works' reserves of coal, why are the general public being deliberately encouraged at present to obtain a twelve months' reserve supply of coal at a time when some gas-works cannot get a twelve days' supply?

Duties of Gas Undertakings.

Clause 95 states: "A company or undertaking supplying or offering to supply gas or electricity for reward . . . shall not accept a certificate of the Local Fuel Overseer for a supply of gas or electricity to any consumer in excess of his previous consumption, unless it is able to make such additional supply without prejudice to its other consumers." But the ability to turn out additional, or for that matter normal, supplies of gas largely depends on the available supplies of coal; and unless an undertaking can be assured of definite amounts of coal arriving to scheduled time, it is neither in a position to accept nor reject the certificate of the Local Fuel Overseer.

Clause 96 goes on to state that "Where an undertaker of gas or electricity is, by reason of the provisions of this Order, prevented from making a supply or from making a full supply to any consumer, it shall to that extent be relieved of any obligation resting upon it by statute or otherwise from making such supply." It is certainly very generous on the part of the Board of Trade to relieve undertakings of their obligations in this matter; but this is the last thing they require—always provided that they get intelligent consideration in the all-important matter of their coal supplies.

In clause 97, we are informed that a gas undertaking "shall keep such records of its supplies to all consumers as the Controller may require; and such records, together with any orders, receipts, or vouchers for such supplies, and the books and accounts shall be open at all reasonable times to the inspection of the duly authorized representatives of the Local Fuel Overseer." Further, undertakings "shall make such returns to the Local Fuel Overseer or the Controller as the Controller may approve for the purposes of this Order." Still more work is foreshadowed in clause 101, which states that gas undertakings "shall, not later than six weeks after the close of any quarter, make a return to the Local Fuel Overseer for each district in which it makes supplies, showing for each consumer in such district the excess supply (if any) which such consumer has taken in such quarter for any premises in his occupation over the allowance shown for such consumer on the certificate received from the Local Fuel Overseer for such premises."

Surely gas undertakings are not now so overstaffed that they can afford the time and labour involved in carrying out these multifarious instructions. It would almost appear that if the extra labour which will be required to conform to the Order in all its complicated details could be diverted to the coal mines, the Order could very well be withdrawn. There are already far too many duties imposed on gas undertakings; and the additional duties and restrictions necessitated by the Order will spell additional financial burdens at a time when the industry is being unduly penalized. If the Order is necessary in the national interests, then the cost of administering it should be wholly a national charge. It is manifestly unfair to impose additional financial obligations on certain industries only, when all sections of the community are affected alike.

Restrictions on New Supplies, Fittings, and Equipment.

Clause 99, enjoins that gas undertakings "shall not, after the date on which this Order comes into effect, without the previous assent of the Local Fuel Overseer, make any new supplies for the purpose either of lighting or fuel, nor shall [they] fit or equip or permit or authorize to be fitted or equipped any premises with additional appliances for the purpose of using gas for fuel without such assent." The reason for the insertion of this clause in the Order is "Not for Publication." If, however, the clause is allowed to operate, much unnecessary hardship will be inflicted on deserving members of the community; and the efforts of the Controller will, to some extent, be stultified. Wasteful conditions will be stereotyped and perpetuated, and excessive labour-absorbing operations will be encouraged; whereas the substitution of a gas cooker in place, for example, of a wasteful open coal-range would result in better service, the restricted use of raw coal, a saving of labour, and an increased output of gas, with its attendant increase in the output of many valuable bye-products.

It is manifestly impossible to deal in one article with all the ramifications of such a voluminous Order as this; but a few outstanding features may be summarized. All possible pressure should be exerted so as to obtain adequate supplies and stocks of gas-works' coal before the coming winter. Every effort should be made to secure indemnification for all additional work which will be imposed on gas undertakings owing to the administration of the Order; and vigorous representations should be made to the Controller with a view to obtaining a substantial increase in the conversion equivalent of gas per ton of fuel.

THE MEASUREMENT OF COAL GAS, AS APPLIED TO MOTOR VEHICLES.

[A Report by Mr. W. Gordon, the Chief Inspector of the Edinburgh Gas-Meter Testing Department.]

This report, dated July 12, is divided into three sections, dealing with the measurement of coal gas for motor traction as obtaining in Edinburgh, then with the various proposals which have recently cropped-up regarding the manufacture of instruments for approximately determining the amount of gas delivered to the gas containers, and (lastly) with the suggested methods of calculating, by computation, the amount of gas required and delivered

Coal Gas for Motor Traction in Edinburgh.

In Edinburgh the use of coal gas for motor traction was introduced by the Scottish Motor Traction Company in April, 1916; and at present upwards of forty omnibuses and char-a-bancs are in daily use. The vehicles are for public conveyance, and ten different routes are traversed. The maximum double journey is thirty miles; the minimum, twelve miles. The steepest gradient —1 in 9—is readily surmounted by any of the vehicles, which weigh about 4 tons (unladen), and are constructed to carry 32 passengers. The average amount of gas consumed, per mile travelled, is 50 c.ft. The calorific value of Edinburgh gas is 515 B.Th.U., and the cost is 3s. 6d. per 1000 c.ft.

In the early and experimental stage of the use of coal gas for internal combustion engines in Edinburgh, no instruments were used to accurately measure the gas supplied; and the Gas Commissioners decided to charge the purchasers for the amount of gas used at a mutually-agreed-upon rate per mile covered by the buses on the whole system. This arrangement, after a trial that lasted fully nine months, was found to be unsatisfactory to the contracting parties; and it was ultimately agreed to instal two suitable sized meters, which had been officially examined and stamped, so that the gas consumed would be accurately measured and recorded on their respective indices. The meters are each constructed to deliver 3000 c.ft. per hour when tested at a pressure of 0·5 in.

The gas containers fitted on top of the vehicles differ slightly in shape and construction; and the capacities of the envelopes vary from 700 to 800 c.ft. Two containers can be filled simultaneously; and the double process is completed in eight minutes, with gas at a pressure of 3 inches. The work of filling the containers goes on almost continuously from 6 a.m. until 10.30 p.m. The amount of gas used by the buses, as recorded upon the meters, is fully 60 million c.ft. per annum.

The existing method of measuring the gas supplied has been in practice for fully eighteen months; and it is certain that no further change will be made in the method of measurement, as the arrangement is giving positive satisfaction to the interested parties.

As the capacity of the containers does not allow of some of the journeys being completed with the initial charge, arrangements have been made by the Scottish Motor Traction Company with various authorities to supply gas to replenish the containers at Penicuik, Rosewell, Broxburn, and Gorebridge, by (respectively) the Penicuik Gas Company, the Lothian Coal Company, the Broxburn Oil Company, and the Gorebridge Gas Company.

Should the gas in the container by any means become exhausted, an amount of petrol is always carried to allow the journey

to be completed. There are also several garages in Edinburgh where dry meters are installed of a suitable size, fitted with a special index, and having an easily-read dial of large circumference, with a centre pointer which indicates 100 c.ft. per revolution. The dial is also subdivided into divisions showing 10 c.ft. The aggregate consumption is recorded as in an ordinary meter, by the usual train of wheels. These meters are used to measure the gas supplied to the containers of any commercial or private motor which is presented for the purpose of being re-filled.

The experience of Edinburgh proves that the ordinary meter will accurately measure and record the gas delivered to containers; but, if the Sale of Gas Act were altered, to permit of meters being officially tested and examined for correctness of registration under different conditions than at present, it would allow of a greater range of meters being utilized for many purposes. Statutory instructions compel official inspectors to examine a meter at 0·5 in. pressure, and restrict the amount of gas delivered per hour to the quantity denominated on the badge attached to the meter. This quantity is for general purposes, ascertained by multiplying the size (designation) of the meter by 6—*i.e.*, a 5-light meter is restricted to pass 5 × 6 = 30 c.ft. per hour; a 20-light meter is restricted to pass 20 × 6 = 120 c.ft. per hour; and so on.

Mr. Gordon suggests that the minimum pressure in testing a gas-meter be 2 inches, and that the quantity delivered be determined by multiplying the size (designation) by 10 instead of 6. By so doing a 5-light meter would be tested while passing 5 × 10 = 50 c.ft. of gas per hour; a 20-light meter while passing 20 × 10 = 200 c.ft. per hour. This change, if adopted, would probably only anticipate by a short time an amendment by the Legislature, as the existing Act was drafted under conditions regarding the distribution of coal gas, entirely different from modern requirements where its general use for lighting, heating, and power demands a working pressure of at least 2 inches.

Filling Gas Containers from Approximately Recording Instruments.

The introduction of gas containers on motor vehicles, although a wartime expedient, apparently does not entitle gas-meter manufacturers to a priority claim for the necessary materials to enable them to produce instruments constructed to meet the requirements as prescribed by the Sale of Gas Act, for the purpose of accurately measuring the gas used; and consequently the supply has become inadequate to meet the demand. Therefore, those responsible for the distribution of coal gas are somewhat reluctant to instal the ordinary type of meter (which they may be fortunate enough to have in stock) for new consumers who have adopted the use of coal gas for motor traction. To obviate the use of the standard gas-meter, numerous contrivances have been devised and constructed; and although up to the present time it is not claimed for these instruments that they meet the requirements of the Sale of Gas Act, it is proposed that, under the existing conditions, they could be utilized, and the consumption of gas would be recorded to a fairly accurate degree.

A local firm of chemical manufacturers recently purchased two instruments of the above category, to be used as "check" meters, and before fixing submitted them to the Department for examination, with the following results.

No. 1 Meter.

Outlet Reduced to ⅜-in. Diameter.		Delivery of Gas per Hour with Open Outlet.	
Pressure.	Gas Passed Unregistered.	Pressure.	
1 in.	36 cubic feet per hour	1 in.	540 cubic feet per hour.
2 in.	36 " " " "	2 in.	780 " " " "
3 in.	36 " " " "	3 in.	840 " " " "
4 in.	36 " " " "	4 in.	1080 " " " "

Percentage Test (Open Outlet).

Pressure.	Result.	
1 in.	3·14	Per cent. fast.
2 in.	4·17	
3 in.	4·17	
4 in.	4·22	

No. 2 Meter (Larger Size).

Outlet Reduced to ⅜-in. Diameter.		Delivery of Gas per Hour with Open Outlet.	
Pressure.	Gas Passed Unregistered	Pressure.	
1 in.	100 cubic feet per hour	1 in.	780 cubic feet per hour.
2 in.	60 " " " "	2 in.	1200 " " " "
3 in.	60 " " " "	3 in.	1440 " " " "
4 in.	60 " " " "	4 in.	1500 " " " "

Percentage Test (Open Outlet).

Pressure.	Result.	
1 in.	3·52	Per cent. fast.
2 in.	3·89	
3 in.	4·00	
4 in.	4·11	

The above figures are not at all encouraging, Mr. Gordon remarks; and it is hoped that machines of greater accuracy will yet be constructed.

It has not been the custom of the makers of this class of instrument to present them for official inspection; but it may further the claim of those who advocate their use if samples were submitted to the recognized authority, so that authentic data could be collected, which would prove of considerable value and interest to the sellers and purchasers of coal gas.

If it is impossible to obtain ordinary meters for the purpose of measuring the gas required for filling containers, Mr. Gordon consideres that it could be recommended to the Board of Trade, as a wartime measure, to relax the conditions of the Sale of Gas Act so as to allow of the use of approximate or differential meters, if they can be produced and officially certified to show a degree of exactness not varying from 4 p.ct. fast or slow on their stipulated delivery. But it is essential that machines of this description should register correctly while passing a small quantity of gas.

Measurement by Computation.

In the early days of coal gas, the amount used by the consumer was estimated by computation—a system which gave rise to many irregularities that were only eliminated when the gas-meter was introduced. It is, therefore, surprising that suggestions have been made to revert to this haphazard method of calculating the amount of gas required to supply and replenish the gas containers attached to motor vehicles. It has been proposed that an initial test of the container should be made, and a certificate issued verifying its capacity—this certificate to be accepted as correct when the container is presented for re-filling not only in the district where it was originally verified but throughout the country. Such a scheme may appear from a theoretical point of view to be a feasible one. But it is not at all practicable and, for the following reasons, not likely to be adopted to any extent by the sellers of coal gas or by the users of gas propelled vehicles: (1) Coal gas is of such an aëriform nature that it must be dealt with and distributed with the utmost accuracy. It varies in bulk with every change of atmospheric pressure and temperature. (2) The originally determined capacity of a container, therefore, could only hold good if it were regularly re-charged under the exact conditions of the gas and barometrical pressure; also with the identical temperature as originally obtained. (3) Owing to the flexible and elastic nature of the material of which the containers are made, and under the sometimes adverse climatic conditions to which they are subjected, they are liable to a considerable amount of wear and tear—thus compelling almost continuous attention and maintenance. In carrying out the necessary repairs, the capacity of the container may be considerably altered from its original dimensions. (4) It would be impossible to correctly estimate and charge for the quantity of gas required to fill a partially exhausted container. (5) An official appointed under the Sale of Gas Act would not be prepared to issue a certificate guaranteeing the constant exactness of the capacity of a flexible container. The verification issued one day may easily become obsolete the next.

Measurement of gas by computation may thus be ruled-out as impracticable. The adoption of the system would lend itself to inaccuracy and waste; also to practices which would be an inducement to dishonesty and unfair dealing.

In conclusion, Mr. Gordon says: It is now quite established that the application of coal gas as a fuel for internal combustion engines in motor vehicles, though brought to successful fruition through the necessities of war, will be continued (either in bulk or under compression) for a considerable period after the conclusion of peace. The permanence and perhaps extension of its use will, of course, depend on the future relative charges for coal gas and petrol. The question of accuracy, and the uniformity of methods in measuring the gas, is of great importance, and worthy of due consideration by the Standards Department of the Board of Trade.

A Japanese Concrete Chimney.

The "Engineering News Record" gives some particulars of a tall reinforced concrete chimney recently completed for a smelter plant built at Saganoseki, Japan. It is 570 ft. high, 42 ft. 8 in. outside diameter at the bottom, and 26 ft. 3 in. inside diameter at the top, with a thickness of 29½ in. at the bottom and 7 in. at the top. The design, which includes provision for earthquake stresses, was checked and approved at the Imperial University of Tokyo. The foundation is a huge block of monolithic Japanese portland cement concrete, in the form of a truncated cone, 17 ft. high, 95 ft. diameter on the base, and 42 ft. at the top. The centre portion of the top is concave, with a bottom thickness of 7 ft. The foundation contains 2711 cubic yards of concrete, and required thirty days' work, day and night, for its construction. The pressure on the base is about 6000 lbs. per square foot, including allowance for wind pressure. The steel reinforcement in the foundation and chimney amounted to 530 tons, consisting of plain round and square bars of American make, all purchased in Japan. The lightning-rod protection is quite extensive. At the top is a copper circle, with seven platinum points extending 4 ft. above the edge of the chimney. From this circle seven cables lead down the chimney. At a height of 400 ft. from the base is another copper circle, or circuit, with four platinum points; and from it four rods lead down to the base.

IRISH ASSOCIATION OF GAS MANAGERS.

Annual Meeting in Dublin.

FAVOURED with beautiful weather, the Association last Tuesday once more returned to Dublin for the holding of their annual meeting, when a fair number of members assembled in the Council Chamber of the City Hall—under the presidency of Mr. H. KIRKHAM, of New Ross.

A WORD OF WELCOME.

As soon as the members had taken their seats,

Mr. J. FLOOD (the Lord Mayor's Secretary) expressed the great regret of the Lord Mayor at his inability, owing to other business engagements, to be present to welcome the members in person. He was, however, glad the Association had come to Dublin, and hoped they would have a good meeting.

The PRESIDENT asked the members to pass a hearty vote of thanks to the Lord Mayor for his hospitality to the Association; and this they did.

THE REPORT AND ACCOUNTS.

The HON. SECRETARY and TREASURER (Mr. G. Airth, of Dundalk) then read the report of the Committee. In this, the Committee expressed regret that the continuation of the war resulted, as in previous years, in the meeting that was held at Belfast not being as largely attended as they would have liked it to be. They again impressed upon the members the necessity of meeting together—more especially when passing through such a crisis as the present one. The management of the largest gas-works was rarely represented at the meetings; and a better example might be shown by their being present to assist with their counsel. The meeting in Belfast was, nevertheless, a great success. At their meeting held in April last the Committee invited Mr. H. G. Burgess, the Coal Controller, to be present. Owing to illness, he was unable to attend, but sent Mr. Gordon, his Head Assistant, before whom the position of the coal supplies, and other matters affecting the industry, were placed—especially in connection with statutory companies. These he had promised to put before Mr. Burgess; but up to the present no reply had been received from this gentleman. At the request of some of the members, the Committee offered to approach by letter the chairman and committee of every gas-works—company or council—in Ireland, with the object of getting salaries increased, and allowances given to members to attend the annual meetings. Many managers, taking advantage of this, were thus enabled to approach their boards, with, it was hoped, good results. A letter was sent to every gas-works in Ireland, asking what were their coal stocks on July 26 last, and on the corresponding date last year. Only 51 replies were, however, received to 109 letters sent out; and a summary of the answers showed that the stocks amounted to no more than 18,011 tons, as compared with 29,457 tons a year ago. A memorial had been addressed to the Lord Lieutenant on this matter, asking for an interview; and he had agreed to receive a deputation at the close of the meeting. The All-Ireland Advisory Committee to the Coal Controller had also been informed of the position, and had advised:

> "That, owing to the uncertainty of means of transit to Ireland, it is of the greatest importance that Irish gas-works should have substantial reserves to secure the gas supply during the winter months."

The Committee regretted to record the death of Mr. F. Eustace, of Tullamore, a Past-President, and a member of the Association since 1897. His genial manner and willingness to do anything to further the interests of the Association would long be remembered.

Mr. G. W. NORMAN (the Hon. Auditor) read the abstract of accounts, which showed receipts amounting to £43 18s. 6d., and a balance brought forward of £51 16s. 7d. Deducting the year's outlay of £57 1s. 7d., the sum remaining in hand was £38 13s. 6d.

The adoption of the report and accounts was moved by Mr. T. J. REID (Ballina), who asked whether the Committee had considered what steps (if any) could be taken to better the financial position of the Association, which he regarded as unsatisfactory.

Mr. H. W. SAVILLE (Drogheda), in seconding, remarked that there would be a discussion on the point referred to at a later stage of the proceedings.

Mr. J. PATERSON (Waterford) said the Committee had been requested to look into the question of a Commercial Section; but there was very slight reference made to the matter in the report, and the members did not know what (if anything) they had done. The Association met year after year, and passed resolutions, of which nothing more seemed afterwards to be heard. Possibly the Committee might have had so much to do looking after the Coal Controller and so on, that they had not had time to go into this question. In regard to the accounts, he did not know that the present would be an opportune time to increase the subscriptions. After all, there had been last year a number of extraordinary expenses which were not likely to recur; and the decrease in the amount in hand was not an alarming one.

Mr. NORMAN pointed out that since the subscription was fixed at 5s. for ordinary and 10s. 6d. for extraordinary members, various items of expenditure had been added to the accounts. In the first place, there was the cost of holding committee meetings. In former days, the committee business was done by letter; but this was found to be very unsatisfactory. Then there were the affiliation fee to the Institution of Gas Engineers, and the subscription to the Benevolent Fund.

Mr. AIRTH explained that the question of a Commercial Section was still in hand. The Committee were not at present prepared to report on the matter; and they feared that Ireland would be found a very difficult country in which to arrange a Commercial Section scheme—members were so far apart from one another.

The PRESIDENT added that the subject of increasing the income of the Association would arise on a debate to be opened by Mr. Brook. As to the Commercial Section, the matter would be mentioned in his address. As they were aware, things moved slowly in Ireland.

The report and accounts were then adopted.

THE PRESIDENT'S ADDRESS.

The PRESIDENT then proceeded to deliver his Inaugural Address, which was given on pp. 301-2 of last week's "JOURNAL." This he announced was open for discussion; and several members took advantage of the opportunity thus offered to refer to certain points that had been raised.

Mr. SAVILLE remarked that there were some things which he thought they, as gas managers, would hardly agree with altogether, though they might agree with the spirit underlying them. If the address went out along with the cry of the shortage of coal, it might lead to the retort that the gas managers were responsible for the shortage themselves, and that there was plenty of coal if they only brought their results up to what they should be. He would be very sorry to think they were generally only selling 8000 c.ft. to the ton; and it would be a pity if it went out that this was the result in Ireland. There were few who were not getting at least 11,000 c.ft. per ton, if not 12,000 c.ft. It was up to them to get as much as ever they could, and secure the resulting economy in the consumption of coal—of course, bearing quality in mind. On the question of the sale of coke per ton, he thought the President was very meek and mild in making his comparison. It should have been at least 50 p.ct. better than it was. As to sulphate of ammonia, it could not be said that they had not been given some increase. Their present price was about £2 per ton more than last year. But they had not been allowed anything to compare with the increased cost of labour and acid. One point that had always struck him was that an English manufacturer of sulphate sending it to Ireland got an allowance for carriage; but those who made it in Ireland, and with carriage to pay on coal, and in many cases on the acid as well, received no allowance. This was not fair under existing circumstances; and the deputation to the Chief Secretary should point out to him that they ought to have a rebate, in some way, of a similar amount to the carriage on the sulphate of ammonia. He proposed a vote of thanks to the President for his address.

Mr. G. W. ANDERSON (London) said that in the Coal Price Limitation Act it was said that the price should be 4s. per ton above pre-war rates. Any common-sense person reading this, would take it to mean that, if he had been paying 12s. before, he should be charged 16s.; but what was the Board of Trade reading of the Act? If some person, instead of paying 12s. per ton, had been paying 20s., that man would have to pay 24s., and everybody else who had been buying a similar quantity of coal had his price put up to 24s. He hoped the deputation to the Chief Secretary would not complicate matters by introducing the very minor subject of sulphate. Taking Irish gas-works generally, very few made sulphate; and for those who did, the profit was a very small one on the price of gas. If matters were complicated, a good excuse would be offered for shelving the whole thing. They should keep to the one matter of coal.

Mr. P. J. M'EVOY (Midleton) thought that if the address could be presented to the Chief Secretary it would do a great deal of good. The coal situation in Ireland had been handled by amateurs—people who apparently had not the least idea of what they were speaking about. It was imperative that the full facts of the case should be placed before the Chief Secretary. He thought himself, with reference to the 25 p.ct. reduction that was spoken of, they should all agree to it. Instead of having a 25 p.ct. reduction, it looked to him more like being 100 p.ct. It was a matter entirely for the Coal Controller. The Association were on the right lines in approaching the Secretary; but the matter should be put before him in an absolutely plain and straightforward way. As to the gas sold per ton of coal carbonized, in most works this varied. If it was straight coal gas, the President, to his mind, was not far out.

Mr. R. G. TAYLOR (Malahide) said that in the works he represented they were getting 12,000 c.ft. They used a lot of steam.

The PRESIDENT said he maintained the quantity he had stated was the amount sold in the smaller works. The bigger works did sell more gas, if they had plenty of steam and producer gas. He was not far out in the amount he gave for small good works.

Mr. PATERSON thought the throwing open to discussion of the President's address might be a dangerous precedent to establish. These addresses were usually regarded as privileged occasions, when the President could ventilate his feelings without challenge. He hoped the members would not in future take it that they had a right to "slate" the President after his address, unless he gave them leave to do so. One point in the address which had specially attracted his attention, was the reference to the restrictions that had been put upon the use of coal gas for traction purposes. When the scarcity of petrol first came about, and users of traction power looked around for a substitute, they could find no better or cheaper one than coal gas; but immediately they hit upon this fact, the authorities, in their wisdom, put a stop to its use. This was a considerable hardship upon the gas industry. However, it had been established that coal gas for traction power was a cheaper source at the present time than any other. This was a matter to bear in mind for the future. He congratulated the President upon the enormous consumption he had for slot-meters. One of the examples given was at the rate of over 30,000 c.ft. per annum for a slot consumer. He himself could not attain anything approaching this figure with slot-meters, though selling gas cheaper than the President. As to make, if the President referred to the average results of the works in Ireland, he quite agreed that 8000 c.ft. per ton and 8 cwt. of coke was rather on the low side. But they must not forget that the vast majority of the gas-works in Ireland were very small—working with one bed of retorts for the best part of the year. This was a very

different proposition from running a works with a large number of retorts. If they took the smaller works on the other side, he did not think they would find very much better results. In fact, he knew places where they did not do so well. The cost of coal now as compared with pre-war times was a very sore point with them all. They in Ireland had been particularly hard hit in freights. In England they had to put up with the high price of coal; but they had not suffered to the same extent in the matter of freights. Freights had risen until the Coal Controller had had to step in and fix them at from four to five times the pre-war rates. This was a very grave injustice. The Company the President represented were embarking upon the electric light, which was a very wise step to take. Gas companies were in a better position than any other body to supply electric light cheaply. They could combine the two businesses in a way that should lead to economy. One speaker had suggested that the industry should agree to the proposed reduction of 25 p.ct. in coal supply. He (Mr. Paterson) totally differed from this view. For the last three years, the Government had been appealing to them to economize coal to the greatest possible extent; and a large number of concerns had acted loyally, and had decreased their consumption. Others, taking last year's figures, had increased their coal consumption up to (say) 30 p.ct. Were the Government going to penalize those who had acted loyally and honestly, and subsidize those who had done nothing to economize? He did not think they should agree to the 25 p.ct. reduction, unless they went back to the pre-war figure as a standard. In view of the fact that it was the truest form of economy to allow people to use as much gas as possible for cooking, they should hold out for full supplies of coal.

The President remarked that it had been pointed out that they had with them Mr. G. W. Anderson, who had supplied both gas and electricity in Buenos Ayres.

Mr. G. W. Anderson (London) said he could not give them much information on this point. He was once connected with works in the Argentine which supplied both gas and electricity. They made about 4 p.ct. on the electricity, and about 19 p.ct. on the gas. The electricity works were in the centre of the city, in a cellar excavated about 50 ft. below the ground level. The Directors decided to sell the works, and give up the supply to a very large company. They did try to arrange an electricity supply for Waterford; but naturally the Council opposed the scheme, and nothing came of it. There was no electric supply yet.

Mr. M. J. Treacy (Wicklow) could not see what advantage there was in introducing electricity snpply in connection with a gas-works. They spent money on a gas-works, then sank a small sum in electricity plant, and afterwards proceeded to compete against themselves. Of course, if they were threatened with outside competition, it was a different thing.

Mr. J. E. Enright (Limerick) asked whether the 8ooo c ft. was gas actually sold and paid for. If it was the amount paid for, it was a figure one need not be ashamed of, in a small works.

The President: It is gas delivered and paid for.

Mr. Paterson said they could not close their eyes to the fact that electricity was the popular light of the moment, and that communities would have it, if they could. If they were in a position to supply it better than anybody else, they should do so. Local authorities often embarked on electric light schemes which involved considerable loss; and every ratepayer had to share this loss. In Waterford, it was suggested by a few local gentlemen that the Gas Company would be the best people to supply electricity. The Company considered the matter favourably, and actually did take steps to apply for a Provisional Order. Up to a certain point, they were encouraged to do this by the local authority; but after a while they began to wonder whether it would not be perpetuating a monopoly to leave things entirely in the hands of the Gas Company. The result was the authority thought they would do better to supply their own electric light. The Gas Company felt they could give a better and cheaper supply than the Corporation, and that if the latter did start a supply it would become a burden upon the rates, when the Company, as the largest ratepayers, would have to subsidize their opponents. This was why they had thought of introducing electricity themselves.

Mr. G. W. Norman (Dublin): I am old enough to remember when the Gas Company here in Dublin had an electricity works, which they let the Corporation take over. The result is that more than half the trade has gone.

The President said he thought his idea of leaving the address open to discussion had proved very beneficial. Of course, he had tried himself steaming in horizontal retorts, and so far had been successful with it; but he let a little too much water gas in, with the result that there were a good many complaints. There was, he believed, no one who could supply electricity better or cheaper than a gas company, because the two businesses could be intertwined. He was thinking of using a suction producer; and if this broke down, they could run on their own gas. If they could get only 2 p.ct. on the outlay, would it not be better for them to secure this than to let someone else in? As to coal carriage, the railways were taken over by the Government; and the dividends were assured. Naturally, the companies would not be likely to care if they never ran a train. The less wear and tear there was on their trucks, the better they would like it. But a steamer would consume as much coal as, or perhaps more than, a train would. The gas companies were asked to do away with their custom, and simply run themselves into bankruptcy; but there was no compensation given to them.

Report of the District Representative on the Council of the Institution of Gas Engineers.

The President then read the following report: "I regret that, as your representative, I have been unable to attend any of the meetings of the Committees appointed by the Institution. But I have received from time to time reports of matters dealt with by them; and I feel that the members of our Association have very little idea of the amount of work done by the Institution as a whole, or of the individual members, who have spent such an amount of time and labour in performing the work of the Committees to which they were appointed. It would be useless for me to attempt to report on the various questions which have been under consideration. Suffice it to say that the Institution is doing its utmost to safeguard the interests of the industry."

Proposed Increase of Subscriptions and the Affiliation Question.

The President, in introducing the question of subscription rates and the affiliation fee to the Institution of Gas Engineers, remarked that, if the members did not agree to the increase in the affiliation fee, there would be very little necessity to ask them to agree to increasing the subscription for ordinary members to 10s. 6d.

Mr. Brook said he would rather put it the other way round. If their own subscription rate was not increased, no additional fee could be paid to the Institution of Gas Engineers. Basing the subscription on the output of the various works, he calculated that they would practically double their income from ordinary members, if the subscription remained the same for works of under 10 million c.ft., and was raised to 10s. for works of over 10 million and under 20 million c.ft. and to 20s. for works of over 20 million c.ft. Reckoning the subscriptions in the three different cases at 10s., 15s., and 20s., would bring in three times the amount. When, however, he saw the suggestion of 10s. 6d. on the agenda, he felt in full sympathy with it. If the Association were to do anything worth calling work, they must have money; and with increasing costs, it was quite necessary that something should be done. He would formally propose that the subscription be 10s. 6d. per annum. At the same time, he thought the membership they had would not justify them in increasing their fee to the Institution of Gas Engineers from £5 5s. to £10 10s., although there were certain advantages in being affiliated to the Institution. While they could not afford to pay more than now, he for one would be sorry to cease the connection. It seemed, however, that if they were not willing to double the fee they would automatically fall out.

Mr. Norman said he had gone through a few figures of back years. For 1912 and 1913, the average expenses were under £40 per annum. Now, the average was about £55 a year. This difference had to be faced.

Mr. Airth pointed out that some time ago they gave their Committee instructions that they must hold an annual meeting in Dublin; and the average expense of each of these meetings was £5 17s. 6d. Then there was a further £5 5s. a year added when they became affiliated to the Institution. The reason why the funds in hand were diminishing was the added expenses, which equalled practically 25 p.ct. of the income. If they added £11 to the outgoings and did not increase the subscriptions, the balance was bound to go down. He had personally, since he had been Secretary, twice written letters to every gas manager in Ireland; but, of course, the number from which they could draw their membership was limited. During the time when the Institution of Gas Engineers were proposing to increase their own subscription from one to two guineas a year, he wrote a letter to the Secretary which he asked him to bring before the Council for their careful consideration. In this, he mentioned that there were many managers who were not able to afford more than a guinea, especially during the trying times now being gone through, whereas many other members who had very large salaries and other perquisites might be willing to pay a higher figure for the sake of their poorer brethren. He afterwards saw a letter written by another gas engineer on somewhat similar lines. Neither letter, however, nor anything pertaining to them, was brought before the annual meeting in London or the meeting held subsequently to confirm the increase to two guineas.

Mr. M'Evoy seconded the proposition—regarding the increase as being absolutely necessary if the Association was to survive.

Mr. T. J. Reid (Ballina) rose to propose an amendment, not because he thought that the increase to 10s. 6d. would be a strain on the members, but that the matter might be further looked into, to see if any other means could be adopted to attain the end desired. Though their organization was styled the Irish Association of Gas Managers, it seemed to be run more in the interests of the gas industry in Ireland than of the gas managers. Therefore he suggested that the Committee should write to the proprietors and those in authority over the various gas concerns, asking them if they could not contribute somewhat on the lines indicated by Mr. Brook, but making the gas concern liable, rather than the manager himself.

Mr. J. O'Grady (Scunthorpe) seconded.

Mr. Saville said that investigations were being made by the Institution which were of more interest to proprietors of gas-works than to managers. He did not think it was fair, at any rate, that the smaller gas managers, who were not so largely interested, should have to pay to the same extent as those in larger works. He would sooner see affiliation dropped altogether than agree to an increase to £10 10s. without some effort being made to raise the money another way.

Mr. P. B. Ellacott (Newry) expressed himself in favour of affiliation, if the money could be raised from the undertakings, who could really afford to pay.

Mr. W. E. Young (Queenstown) did not think the matter was urgent. They had still a good sum in hand. As to the suggestion that the gas concerns should pay the expenses of members, there were a good number of works in Ireland which at least did their share. He knew of some companies who paid their managers' railway expenses down to the meeting; and if this plan were generally adopted, their meetings would be more successful.

Mr. Norman remarked that they were going backwards.

Mr. Anderson said he would ask the members if they thought they had received any benefit from affiliation with the Institution.

Mr. Reid replied that he had received no benefit; and he did not know of anybody who had.

Mr. Saville pointed out that most of them were members of the Institution; and any benefit derivable from the Institution they obtained direct, and not through the Irish Association.

Mr. Anderson: Will your position be strengthened by being affiliated to the Institution?

Mr. Saville said the only difference was that in one case they had a representative on the Council, and in the other they had not.

Mr. Paterson thought the whole matter should be referred back to the Committee. The time was inopportune to interfere with the subscriptions. If the Committee made proper representations to the proprietors of gas undertakings, they would have no objection to paying members' subscriptions. He did not mind the amount being 10s. 6d., provided it was paid by the undertaking, and not by the manager.

He believed in England and Scotland it was generally the undertakings who paid the subscriptions of their managers.

After more discussion, another amendment moved by Mr. PATERSON and seconded by Mr. J. E. ENRIGHT (Limerick) was carried by thirteen votes to eight—"That no change be made at present, but that the matter be referred back to the Committee for further consideration, and to report upon at the next general meeting."

Mr. REID then proposed—"That it be an instruction to the Committee of this Association that they shall, when going into the question of the raising of subscriptions, consider whether the proprietors of gas concerns might not be asked to contribute to the funds of the Association on any basis which the Committee might think equitable."

Mr. P. J. FITZPATRICK (Maryborough) seconded this; and it was unanimously agreed to.

There was then an interval for luncheon, on the invitation of the President; and on the resumption of the proceedings,

Mr. R. YOUNG read a paper on the "Working of the Carburetted Hydrogen Plant at the Parsonstown Gas-Works." This, with the subsequent discussion, appears as the next article.

Mr. REID had promised some "Random Thoughts;" but unfortunately time did not permit of him giving expression to them.

THE PRESIDENT'S MEDAL.

Mr. BROOK then, in the absence of the Lord Mayor, who would otherwise have been asked to perform the ceremony, said the pleasant duty fell to him of presenting Mr. Kirkham with the President's medal. He hoped he would be long spared to value it.

The PRESIDENT, returning thanks, remarked that the medal would always awaken within him many pleasant memories.

OFFICE-BEARERS AND NEW MEMBERS.

The Scrutineers (Messrs. J. H. Barrett, of Bangor, and L. P. Phillips, of Dublin) then reported that the following had been elected:

President.—Mr. H. W. Saville, of Drogheda.

Vice-President.—Mr. W. E. Young, of Queenstown.

Members of Committee.—Mr. T. Frizelle, of Holywood; Mr. W. Miller, of Cookstown; and Mr. J. Paterson, of Waterford.

Auditor.—Mr. G. W. Norman, of Dublin.

Hon. Secretary and Treasurer.—Mr. G. Airth, of Dundalk.

New Members.—Mr. F. Wood, of Tullamore; Mr. P. J. Walsh, of Kilrush; Mr. M. J. Fogarty, of Warrenpoint; Mr. R. F. Cotton, of Dublin; Mr. E. J. Enright, of Tralee; Mr. H. A. Thomas, of Longford; and Mr. A. J. Roberts, of Donaghadee.

THANKS TO THE SECRETARY.

On the proposition of Mr. BROOK, seconded by Mr. W. E. YOUNG, Mr. Airth was cordially thanked for the services rendered by him as Secretary and Treasurer.

PLACE OF NEXT MEETING.

Mr. SAVILLE proposed, Mr. BROOK seconded, and it was agreed, that the next meeting be held in Dublin.

THE DEPUTATION.

The proceedings had to be brought to a conclusion somewhat early, in order to allow of the keeping of an appointment which had been made for a deputation of members of the Association to wait upon Mr. Edward Shortt, K.C., the Irish Secretary, to lay before him facts regarding the coal position. The deputation consisted of the President (Mr. H. Kirkham), the Vice-President (Mr. H. W. Saville), Mr. George W. Anderson, Mr. J. Paterson, Mr. T. J. Reid, Mr. A. S. Brook, and the Hon. Secretary and Treasurer (Mr. G. Airth).

The deputation was introduced by Mr. Airth, who explained that during the last few months coal stocks had been allowed to get down to a very low level in Ireland. As a matter of fact, members who were present at the meeting earlier in the day had given him figures showing that there were only 18,000 tons of coal in stock at their works, compared with 29,000 tons a year ago. The rationing of coal would lead to great hardship among the poor, because they had always been in the habit of buying coke, and had no coal merchants; and when the supply of coke was stopped, they would be without any heating medium, unless they could get wood or turf, which in some parts of the country would be an impossibility. A point was made of the fact that penny-in-the-slot gas-cookers were more numerous in Ireland than across the water. Rationing had now been reduced to its finest point, and pressures were as low as they possibly could be. Gas-works would be at the mercy of these consumers, who might at times run them out of their stock of gas, if coal stocks were allowed to fall below at least a reasonable minimum quantity. The deputation asked that at least eight weeks' winter stock should be supplied to all gas-works before the end of next month. They placed their views before the Secretary in regard to the North-West, the North-East, the East, and the South of Ireland; the interview extending over more than an hour.

Mr. Shortt received the deputation in a very kindly way, and said that his sympathies were certainly with them; but, of course, all he could promise was that he would forward the petition to the proper quarter, and do whatever he could to make their appeal effective.

THE DINNER.

In the evening, the annual dinner took place in the Dolphin Hotel; a short toast list being interspersed with songs and recitations. After "The King" had been proposed by the President, Mr. G. W. Anderson submitted the "City of Dublin," which was responded to by Mr. J. E. Enright. "The President" was proposed in felicitous terms by Mr. H. W. Saville, and "The Hon. Secretary," by Mr. T. J. Reid. Captain Thompson, of the Berks Yeomanry, submitted "The Ladies," which was responded to in a poetical vein by Mr. G. W. Norman.

AN EXCURSION.

On the following day, members and their lady friends, to the number of over fifty, travelled by brakes to Lucan, passing through Phœnix Park, whose full magnificence they were afforded a perfect opportunity of appreciating, and amidst lovely scenery along the River Liffey, to the Spa Hotel, where an excellent dinner had been prepared for them. This was followed by a walk to the Salmon Leap, and after tea in the hotel, the party returned to the city thoroughly well pleased with the outing, the arrangements for which had been well carried out by the Hon. Secretary.

WORKING OF THE CARBURETTED HYDROGEN PLANT AT PARSONSTOWN GAS-WORKS.

[A Paper Read before the Irish Association of Gas Managers, Tuesday, Aug. 13.]

By R. YOUNG.

The object of this short paper is to give some information as to the working of the carburetted hydrogen plant erected at the Parsonstown Gas-Works some eighteen months ago. The writer had hoped to give something unusual and of considerable interest, but unfortunately the supplies of coal over the period under review have been so very irregular as to quantity, and especially as to quality, that it has only been possible to keep the plant running under the greatest difficulty and hardship, and the results achieved would not be a fair record of the capability of the plant.

When originally started the plant was worked in conjunction with the coal-gas retorts, by mixing 50 p.ct. of carburettted hydrogen gas with the coal gas, using coke and tar in the carburetted hydrogen generator. After a few months' working, it was found that there was difficulty in maintaining a uniform quality of mixed gas, and, further, that there would be no possibility of having a sufficient supply of coke for the generator, especially in the summer time, and little or no economy in having two plants working.

It was quite evident that some change in the mode of working would be necessary, so it was decided to make the then considered drastic attempt of producing all the gas required in the carburetted hydrogen plant. After consultation with the makers of the plant, who willingly undertook necessary structural alteration and substituted their latest patent double valve wash box arrangement of wet valves, in place of dry disc valves, for the up and down gas runs, the plant was restarted with the view of making all the gas required, using turf and coal principally and occasionally timber logs and coal. After a few trials and troubles, this method of working was found to be a decided improvement as far as the uniformity of the quality of the gas was concerned. It gave greater satisfaction to the consumers, as the lights were less liable to get out of order.

The working of the plant during this time was greatly handicapped by the inferior quality of the coal; the supply being mostly coking coal with a very large percentage of ash, causing a great amount of clinker to grow up in the generator, to remove which it was necessary to stop-down the plant for about seven hours every week. Moreover, coking coal is apt to coke in the retort, which requires breaking-up every hour and a half or so. Occasionally a few wagons of splint coal were used. This was found more satisfactory, as it did not coke so readily in the retort, allowing the fuel to drop more evenly into the producer, and keeping the clinker nearer the fire bars, where it could be got at and removed without letting down the plant.

The most satisfactory results are obtained from cannel coal with a low percentage of ash or from good non-coking coal. With such coal nearly 30,000 c.ft. of gas can be obtained (including all stand-by fuel for boiler) of a quality of about 400 B.Th.U., which has been found quite satisfactory for incandescent lighting and gas-stoves, gas-engines, and other purposes for which gas is required. The average yield has been about 24,000 c.ft., but with suitable non-coking coal of good quality very much better and altogether more satisfactory results will naturally be obtained.

If a suitable supply of good black stone turf could be got at a reasonable price, it would add to the economy of working. Castlecomer anthracite coal is very good mixed with cannel, but must be used sparingly, as it forms a very hard clinker, and large purifiers would be necessary to deal with the sulphur content. On several occasions during last winter I was using as much as 75 p.ct. of turf in order to economize coal and avoid a shortage in the gas supply.

The plant consists of a 12 h.p. vertical steam boiler, a 9 h.p gas engine and blower, a tower scrubber fitted with drain tiles and the generator. The generator differs from the ordinary water-gas generator in that it is fitted with a retort surrounded with chequer brickwork, which acts as a steam superheater and gives a deeper bed of fuel for gas making, utilizing heat which without it would be wasted. This heat also carbonizes the coal in the retort. The coal gas generated in the retort mixes with the water gas, and during the blow this coal gas is passed direct into the holder.

During the blow the blast gases pass up around the outside of the retort, through the chequer brickwork, and out of the

snift valve on the top of the generator. The pressure of the blast gas forces the coal gas from the retort through the gas outlet pipe at the top and the open outlet valve. This is an important point, as without this arrangement valuable rich coal gas would be burned to waste in the chequer brickwork, causing smoke and trouble. Possibly it would be more economical to drive the fan by means of a steam engine instead of the gas engine, as the boiler is sufficiently large for both steaming the plant and driving the blower. In working the plant in this way there is no necessity for a relief holder, which you require to have when mixing with coal gas.

The plant is pretty much fool-proof, and is worked by a lad of sixteen years. The operation of opening and closing the main blast valve, secondary air valve, and snift valve is all done by one wheel, and no mistake can be made.

The conclusion arrived at after this experiment is that the plant is very suitable for small words such as that at Parsonstown, or even smaller ones where there is not enough coke in the summer time to heat the retorts in an ordinary retort bench. Another important point in favour of the plant is the speed in getting it up to make gas after being let down, which gives a further advantage of doing away with a lot of Sunday labour.

Discussion.

Mr. J. PATERSON (Waterford) said perhaps Mr. Young could supplement what he had already said by telling them what really led to his abandoning the making of coal gas and resorting to the manufacture of methane-hydrogen gas, and what benefits had accrued from such a change. Had he been able to produce gas cheaper, or were there some other reasons for the alteration? A rough idea of what led to the adoption of the plant, and the cost as compared with the method which prevailed before, would be of help to them.

Mr. H. W. SAVILLE (Drogheda) remarked that he was unable to follow the description of the plant from what the author had stated. It seemed to be different altogether from the methane-hydrogen plant that had before been described to them, in that there was incorporated with it a retort.

Mr. J. E. ENRIGHT (Limerick): There must be a retort of some description to make the gas.

Mr. W. E. YOUNG (Queenstown): Is the plant the same as the original methane-hydrogen plant? It is described as a carburetted hydrogen plant; and I was wondering where the carburetting came in, unless it was carburetted from the coal gas. But I see he recommends non-coking coal, and also anthracite coal; and in that event, I cannot see where the carburetting comes in.

Mr. SAVILLE (continuing) said he was going to mention the point of the carburetted hydrogen plant. What was the gas carburetted with? Originally the methane-hydrogen plant was intended for carburetting with tar; but now they were not allowed to use tar for any of their own purposes, so it could not be carburetted with tar. Was it a case of using oil, or were they not carburetting, and using plain power gas?

Mr. T. J. REID (Ballina) said he did not think it was fair to ask the author of any paper to supplement his remarks. He had written his paper, and possibly considered it fully; and he decided, wisely or unwisely, upon the information he felt called upon to give the Association. He (Mr. Reid) had not found any difficulty in following the description of the plant given in the paper; but this might be owing to the fact that he had had an opportunity of studying it. Perhaps if he were to give an outside opinion of the plant it might help those members who had asked for further information concerning it. The generator was what would be called a boiler-shell. In this was built a retort surrounded by chequer work. The bottom of the retort came down to within 5 or 6 ft. of the ground level. It was a built-up vertical retort. The gas-outlet from the retort was at the top of the generator. The charging door of the retort or producer was at the side; and the clinkering door was at the side also. So far as he could see, the method of working was this. Mr. Young was using half peat and turf; and he was carburetting the gas by the coal. The method of working was that the contents of the retort were blown-up just as in the case of the ordinary producer, except that the blast gases were passing up outside the retort itself, and not altogether through it. As Mr. Young had explained, he kept his outlet-pipe open during the blow; and he had it so adjusted that the blast gases were just sufficient to drive off the amount of coal gas retained in the retort. This, no doubt, was a matter of discretion. It seemed to work quite satisfactorily. A question he would like to ask Mr. Young was whether there was any advantage at all to be gained by retaining the chequer-work outside the retort. Would as good results not be obtained by considering the plant merely as an ordinary producer, which could be made from almost scrap material in any gas-works, and might the quantity of fuel which would be wasted in the blowing-up process not be compensated for by obviating heating the retort from the outside? He did not know whether the gas as supplied to the consumers merited their approval; but so far as he could see, it was doing everything that gas could do. It was running perfectly with engines, under most distressing conditions, and giving an adequate light in incandescent burners, and excellent results with cookers. What more one could want, he did not see. The auther was to be congratulated upon relieving the situation under conditions of scarcity of coal.

Mr. ENRIGHT remarked that he was pleased to learn the anticipations he had put before them in his address a few years ago* had been fully borne out in practice by Mr. Young in another works. On that occasion he had stated that the plant which he had installed at Tralee was a great comfort to the manager, and saved him much trouble and anxiety. He was then of the opinion—and he thought the paper bore him out—that it was quite within their power to manufacture gas in this plant, with a good cannel coal, almost up to 40,000 c.ft. per ton. Mr. Young stated that he had obtained 30,000 c.ft.; and he (the speaker) believed that under better conditions and continual working, he would secure 40,000 c.ft. per ton of coal. The author had visited Tralee, and had ample opportunity of examining the plant inside and out; and he had seen the drawings of the generator, which was exactly as described. With regard to satisfying the requirements of the consumer, they had been sending out coal gas absolutely the same as was done by small works having no auxiliary plant; and before the public were in possession of any of the facts, they were sending out 50 p.ct. of mixed gas. Some of the local papers referred to the increased illuminating power of the incandescent burners, which he then attributed solely to the greater flame temperature of the mixed gases. The Local Government Board Auditor's remarks on the accounts for the year ended March, 1917, were of interest. The report for 1918 was not yet to hand. The Auditor said that at first sight the figures in the cash account were unsatisfactory. A credit balance of £423 had been replaced by a deficit of £1864. The position, however, was by no means unpromising. The new carburetted hydrogen gas plant installed during the early part of the year was likely to revolutionize the affairs of the Committee. This was his summing-up of the financial side of the department. The Auditor then went on to refer to the cost of the two gases into the holder. He said: "The first ten months' working of the new plant effected a saving of about 900 tons of coal, value some £2250. A permanent annual saving of 1200 tons is estimated—value, at present prices, about £3000. The new plant produced from 363 tons of coke 15,225 000 c.ft. of gas. At the same time there was produced from 1357 tons of coal in the old plant only 14,885,000 c.ft. The cost of production was over 4s. per 1000 c.ft. for coal gas, and from 1s. 2d. to 1s. 3d. for the new carburetted hydrogen plant" These in both cases were net costs into the holder, exclusive of capital charges. For coal gas, the figure was 5'37d. per 1000 c.ft. They used 1782 tons of coal at 50s. per ton; the carbonizing wages were £425; salary, £100; yard labour, £106; repairs to works, £249; repairs to retorts, £55; and purification, £25.

Mr. PATERSON: Is credit given for the value of the residuals obtained in the case of the coal gas?

Mr. ENRIGHT said it was. As to the cost of the carburetted hydrogen, 363 tons 9 cwt. of coke cost £599; 10,197 gallons of tar, £63; wages, £128; salary, £50. The cost was thus 13'27d. per 1000 c.ft. into the holder. The coke was charged at the selling price to the consumer, at from £1 to £2 per ton, and the tar at 1½d. per gallon. He was giving figures for a similar plant to Mr. Young's. At the time to which he was referring, they could not sell their coke; and this was one of the reasons for putting up the plant. They had no one to take any quantity, except one or two bakers. In answer to some questions, he maintained that the price he had given for coke was then the average price over the whole of Ireland.

Mr. SAVILLE: I beg to differ.

Mr. ENRIGHT (continuing) said that at the time of his address he had only been working the plant for two months. The figures to which he had alluded were in an article subsequently contributed by him to the "GAS JOURNAL" [Vol. CXXXVIII., p. 185]; and they had never been disputed. He was quite open to substantiate them.

Mr. A. S. BROOK (Lisburn) said that, in connection with plants they now heard of—such as steaming and methane-hydrogen—the figures submitted might sometimes, without special thought being given, lead one astray. He agreed with Mr. Paterson that the paper would have been of more value if the author had given them further figures. They had been told that they could make a considerably greater quantity of gas by resorting to steaming. Quite recently he had gone through some figures relating to a case where steaming was in operation with vertical retorts; and he then saw that the engineer in charge, in preparing his statement, had allowed for a sale of coke of 3 cwt. for every ton of coal. This certainly would, whatever he got in increased gas, make a considerable difference at the end of the year with regard to his sale of residuals. In looking into a matter of this sort, it was very necessary to note how the balance-sheet—which, after all, was the thing—would turn out. He could quite see that, if a man had no sale for coke, or got a bad price for it, it might be a good thing to have a plant of this kind on the works; but where coke realized a better price than coal, it would be a different matter. Personally, he would have been greatly obliged to Mr. Young if he had given them figures of his cost of working. Those mentioned by another speaker were most alarming, on first hearing them.

Mr. ENRIGHT said he might refer them to the Local Government Board inquiry held in connection with the matter, when the Inspector had no hesitation whatever in recommending the granting of a loan for this plant. It was then stated that the make of gas per ton of coal carbonized was 10,780 c.ft., and the make of carburetted hydrogen 42,000 c.ft. per ton of coke gasified, including the coke used for steam purposes. These figures showed "how coal economy has been helped. Had it not been for the new plant, 3194 tons of coal would have had to be purchased, shipped, delivered, and handled and carbonized on the works; while the coke and tar were there, products of the smaller quantity of coal carbonized. The value of the saving of the lesser quantity of coal, 1412 tons, required at 50s. per ton represented a sum of £3350, a direct saving on the expenditure side of the accounts. Of course, from this amount must be deducted the loss on the receipts side of the accounts of about £1500 for coke [at the then selling price], which would have been available for sale if the full complement of coal had been carbonized, thus showing a net saving of £1850 effected on the ten months' working of the plant." This would prove that there had been no deception.

Mr. BROOK: We are not accusing each other of deceiving one another.

Mr. ENRIGHT: It might be better to use the word "misleading."

Mr. BROOK: I should not like it to be thought I was accusing you of misleading. I merely said that the figures at first sight are rather alarming.

The PRESIDENT (Mr. H. Kirkham, of New Ross) said they were much obliged to Mr. Young for giving them this paper. He had noticed for years that when members read papers before the Association—and he took it that this had a great deal to do with the fact of members not coming forward with papers—they were handled rather roughly. He knew of members who were getting very good results; but they would not come forward with papers describing them. Any member who read a paper ought to be encouraged. Mr. Young had

* See "JOURNAL," Vol. CXXXV., p. 300.

been in very difficult circumstances in carrying on his work. He was in the middle of Ireland, away from all the coal; and he was deserving of the greatest credit for his efforts to get along.

Mr. YOUNG, in reply, said there was no gas manager who had not been troubled about coal for the last three years; and this was one of the main reasons that made him tackle the subject of this plant, which he saw at Tralee some years ago. Of course, the price of gas into the holder was rather a variable figure at best. The present price of gas into the holder was practically about 2s. 9d. per 1000 c.ft. For ordinary coal gas it would work out at something like 4s. At to whether this methane-hydrogen plant was the same as carburetted gas plant, and what was the method of carburation, there was no carburetting in it. He used, if he could possibly get it, nothing but cannel coal. Unfortunately, however, they could not obtain this; and as a rule he had to use two-thirds ordinary gas coal with the cannel coal. But with the cannel it was really remarkable. It was not only better as far as the yield of gas was concerned, but the quality was much better as well. Mr. Reid had discussed the chequer-work with him before; but so far as he (the speaker) could see, it would be a big loss to do away with it.

Mr. ENRIGHT: The waste gas is used as a means of heating the retort and blowing for a shorter space of time.

Mr. YOUNG (continuing) said that during the blow, all the gas would have to go up through the snift-valve, without any chance of catching any gas from the retort. The retort came to within 5 ft. of the bottom of the producer, and the gas was blown right up outside of it; whereas if there was no chequer-work, it would have to be blown up inside the retort. He was very grateful to Mr. Enright for supporting his little endeavour.

WAGES OF GAS WORKERS.

Recent Awards of the Committee on Production.

In connection with gas-workers' wages, particulars of the following awards by the Committee of Production have been notified.

BLACKPOOL CORPORATION GAS-WORKS.

The parties to the reference were the Blackpool Corporation Gas-Works and the National Union of General Workers. The claim submitted was for the payment of 20s. per week and 12½ p.ct. on earnings to members of the Union employed in the gas-works of the Blackpool Corporation as from March 21, 1918, in accordance with the award of the Committee, dated March 27. Representatives of the parties were heard on July 31. Certain proposals had been put before a mass meeting of the employees of the Corporation (including those gas workers who were not then engaged on the shift then being worked) held on Feb. 10 last; and the employees present at the meeting agreed to accept, *inter alia*, the proposal that, in lieu of the then existing war wage advances and war bonus payments, a war wage of 16s. per full ordinary week should be paid to the men employed in the Gas Department, at the rate of 2s. 8d. per day or shift for each day or shift worked, and that such war wage advance should be taken into account in the calculation of payment for overtime, and should come into operation as and from the first full pay after Jan. 1, 1918, and continue for a period of six months at least from that date. The men concerned were duly paid, and accepted, the war wage of 16s. per full ordinary week as provided in the agreement; and on the expiration of six months from the first full pay after Jan. 1 received a further war wage of 4s. per full ordinary week—making a total war wage of 20s. per full ordinary week. The men concerned in this arbitration claimed payment of the further war wage of 4s. per full ordinary week, in accordance with the general gas-workers' award of March 27 last (No. 1068)—namely, from March 21. The Corporation were not parties to the latter award. In view of the agreement referred to, and of the acceptance by the men concerned of the payment of the war wage of 16s. under the agreement, the Committee found that the claim was not established.

MANCHESTER CORPORATION GAS, ELECTRICITY, AND WATER DEPARTMENTS.

The parties to the reference were the Manchester Corporation Gas, Electricity, and Water Departments and the Manchester Municipal Officers' Guild. The claim submitted was for an increase of the present war bonus allowed to the administrative, technical, and clerical staffs—to a uniform rate of 20s. per week to the adults of such staffs and a *pro ratâ* increase to the other grades throughout the service. Representatives of the parties were heard on Aug. 1. The bonuses being paid were as follows: Male staff, adults up to £192 per annum, 16s. a week; £192 to £336, 13s. 6d. a week; juniors under 18 years of age, 10s. a week. Female staff, adults up to £192 per annum, 13s. a week; £192 to £336, 11s. 6d. a week; juniors under 18 years of age, 10s. a week. The award of the Committee is that the male employees, aged 18 years and over, shall receive an advance of 4s., and those under 18 an advance of 2s. per week. The female employees, aged 18 years and over, shall receive an advance of 3s., and those under 18 an advance of 1s. 6d. per week. The amounts awarded are to be regarded as war advances, and recognized as due to, and dependent on, the existence of the abnormal conditions now prevailing in consequence of the war. The award is to take effect as from the beginning of the first full pay following Aug. 1.

MERTHYR TYDFIL GAS COMPANY.

The parties to this reference were the Merthyr Tydfil Gas Company and the Gas Workers' Union. The claim was for the rates and conditions specified in Award No. 1068 of the Committee on March 27 last (Gas Workers). Representatives of the parties were heard on Aug. 8. The award of March 27 applied to gas workers generally, and granted from the beginning of the first full pay after March 21, 1918, an advance of 4s. a week to men whose previous advances over pre-war rates had amounted to less than 16s. a week, and to men whose war advances were 16s. and over, but less than 20s. a week, such an advance as would bring their war advance up to 20s. a week. In addition, plain time-workers, 21 years of age and over, were granted a bonus of 12½ p.ct. on earnings. By Award No. 951 of the Committee, dated March 8, relating to members of the Workers' Union in the employ of the Merthyr Tydfil Gas Company, the men concerned in the present claim received such an increase as brought their war advance up to 16s. a week, payable from the beginning of the first full pay in January, 1918. The present claim was that the men should receive the war wages advance and 12½ p.ct. bonus specified in the award of March 27, in addition to the advance which they received under the award of March 8. The award of the Committee is in the following terms: (6) Having regard to the advance which the men received under the award of March 8, their claim that they should also receive the wages advance specified in the award of March 27, is not one that can be granted. (7) The men concerned, aged 21 years and over, who are paid as plain time workers, shall receive a bonus of 12½ p.ct. on their earnings, which shall not alter, or become part of, their time rates. (8) Clause 7 of this award shall not apply to any workmen in receipt of any allowance or bonus other than: (*a*) An allowance or bonus wholly dependent on timekeeping; (*b*) an allowance or bonus (not being a bonus on output) less favourable to the men than the advance of 12½ p.ct. hereby awarded, in which case the existing allowance or bonus shall merge in the 12½ p.ct.; (*c*) war advances given to assist in meeting the increased cost of living since the outbreak of the present war. (9) The men concerned, aged 21 years and over, who are piece workers, or are paid on a premium bonus system, or any mixed system of time and piece, or any system of payment by results, including men working at augmented time rates fixed in lieu of piece rates, or by reference to results or to output of work, shall receive a bonus of 7½ p.ct. on their earnings. (10) Any bonuses or war advances which, in the case of time workers, have merged in the bonus of 12½ p.ct. granted to time workers, shall, in the case of piece workers, merge in the 7½ p.ct. bonus. (11) If any payment has been made to the workmen concerned, a pending general consideration of their position in relation to the bonus of 12½ or 7½ p.ct., either by agreement or as a result of arbitration, the amount of such payment shall merge in the bonus awarded under Clauses 7 and 9 of this award; and such bonus shall be in lieu of, and in substitution for, any such other payment. The award does not apply to workmen paid a wage or salary not dependent on time worked, or an upstanding wage or salary which covers overtime or other allowances. The award shall take effect from the beginning of the first full pay after the date hereof (Aug. 9).

SOUTHGATE AND DISTRICT GAS COMPANY.

The parties to the reference were the Southgate and District Gas Company and the National Union of General Workers. The claim submitted was for an extension to the members of the Union in the Company's employ of the terms of the Committee on Production award, dated March 27, 1918. (Gas Workers). The representatives of the parties were heard on July 31. The men concerned have received advances during the war varying from 11s. 6d. up to 23s. per week. The award of the Committee is as follows: "Wages.—Where the general advances (including bonuses but excluding advances arranged before Aug. 4, 1914, but coming into operation after that date) given since the outbreak of the war to male employees, aged 18 years and over, amount to 16s. per week and upwards, but are less than 20s. per week, there shall be paid such further increase as shall make the advances up to 20s. per week over pre-war rates, payable at the rate of 3s. 4d. per day or per shift for each day or shift worked. Where the advances amount to less than 16s. per week, the men concerned, aged 18 years and over, shall receive a further increase of 4s. a week; the payment of such amount, together with the existing advances, to be made on the basis of a week of six days or six shifts. Boys and youths under 18 years of age shall receive an advance of 2s. per week (payable at the rate of 4d. per day or per shift for each day or shift worked), subject to a maximum advance of 10s. per week over pre-war rates. The amounts hereby awarded are to be taken into account in the calculation of payment for overtime or night duty, or for work on Sundays and holidays. They are to be regarded as war wages, and recognized as due to, and dependent upon, the existence of the abnormal conditions now prevailing in consequence of the war." In regard to the bonus, the award is substantially in the terms of that of the Merthyr Tydfil Gas Company given above. Where advances have been given in excess of 20s. over pre-war rates, such excess shall merge in the bonuses of 12½ and 7½ p.ct. The award shall take effect as from the beginning of the first full-pay in July.

TIVERTON, TORQUAY, PAIGNTON, BRIXHAM, AND EXMOUTH GAS-WORKERS.

The parties to this reference were the Tiverton Gas-Works, the Torquay, Paignton, Brixham, and Exmouth Gas Companies, and the Dock, Wharf, Riverside, and General Workers' Union. The claim submitted was for the extension of the award of the Committee on Production dated March 27 (Gas Workers) to members of the Union in the employ of the undertakings mentioned. Representatives of the parties were heard on Aug. 6. Subsequent to the general award of the Committee for gas workers, the men concerned in the present claim received an advance of 4s. per week. The award of the Committee is practically in the terms of the bonus award in the case of the Merthyr Tydfil Gas Company recorded above, and is to take effect as from the beginning of the first full pay following Aug. 9. The award does not apply to classes of workmen, such as building trade operatives, whose wages have customarily been regulated by the movements in the wages of the trades in which the same classes are ordinarily employed.

A bulletin recently issued by the United States Bureau of Mines stating that plants are at present in operation treating from six to nine million cubic feet of natural gas daily for the recovery of motor spirit. The yield varies from one to four (American) gallons per 1000 c.ft.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

A Central Committee to Deal with Public Prejudice.

Sir,—Mr. W. G. Bradshaw's striking speech at the meeting of the Commercial Gas Company, on Thursday last, was worthy of his reputation. He bluntly told the shareholders the facts. He did not indulge in glowing prophecy of a glorious future for the industry.

But what astonishes me is the neglect of the gas companies to establish a Central Committee for the protection of their interests and for the publication, according to circumstances, of facts unknown to the consumers and to the critics of the companies. Other business undertakings, as we all know, took this precaution years ago. With characteristic foresight—the cinematograph trade formed such a Committee not long since. The National Gas Council is admirable for well-defined functions. It is, I believe, a body of experts, and its capacity for detail cannot be surpassed. The entire industry is under a debt of obligation to Mr. D. Milne Watson and his colleagues. But the Council was not constituted for a task that requires other than technical qualifications. Erroneous views as to the industry abound and multiply. Popular prejudice is strong. Unless the industry is reconciled to the prospect of genteel poverty, a different atmosphere ought to be created—and could be created. From want of knowledge of the conditions, smaller consumers are becoming increasingly unfriendly to gas companies. On the other hand, the recent discussions in the House of Commons disclosed considerable support of the gas companies' case, as the result of the representations of gas shareholders to members of Parliament.

Mr. Bradshaw was scarcely correct, I think, in one respect; and perhaps he will excuse my directing attention thereto. In the course of his speech, he stated that

> **The House of Commons at once recognized that inasmuch as the sliding-scale provisions had been fixed to secure good management under normal conditions, it would be grossly unfair to the people who had supplied capital to establish and maintain gas undertakings if the scale were made to apply rigidly to war conditions, which were totally unforeseen when the scale was fixed with the authority of Parliament.**

I take exception to the words "at once." The House of Commons had to be acquainted of the facts, and to be argued with. It did not, as Mr. Bradshaw's words suggest, promptly perceive an injustice and joyfully proceed to remedy it. Indeed, if the Government Whips had not been taken off, the division might have gone against us badly.

Another remark of Mr. Bradshaw's also attracts attention. He stated:

> **There is a good deal to be said for the argument that because the Government has fixed its own price for the residual products it takes for the manufacture of explosives, and because that price is much below the market value, the cost of the relief granted to the shareholders should, at any rate, in part fall upon public funds, and not upon the consumers of gas; but that view was not prominently put forward by the opponents of the Board of Trade Relief Bill.**

Well that view was vigorously expressed again and again by the opponents of the Statutory Undertakings (Temporary Increase of Charges) Act. I would refer Mr. Bradshaw to the "Parliamentary Debates" of the House of Commons and particularly to the speech of Mr. J. D. Gilbert, M.P. Moreover, I read in the "Star" newspaper a week ago an exactly similar and definite expression of view. The critics went out of their way to urge this view.

The extraordinary thing, to my mind, is that the members of Parliament associated with the gas industry did not press it; especially as there was a welcome interval of a fortnight—July 8 to 22—allowing for an exchange of opinions and for arrival at an agreement.

However, the experience of July, 1918, is warning enough in all conscience, and should convince all that the establishment of a Central Committee is an essential step.

W. Allard.

Crescent Road, Kingston-on-Thames, Aug. 17, 1918.

Gasholder Construction.

Sir,—We notice in your issue of July 30 (p. 210) a description of a patent issued in the joint names of Messrs. R. & J. Dempster, Ltd., and Mr. G. F. H. Beard, for a means of strengthening the dips of telescopic gasholders by connecting the vertical stays or spiral guides to the circumferential channels. We beg to say that we have carried out this kind of construction on many large gasholders during the last ten years. Therefore it is not novel or susceptible of being made the subject of proprietary rights.

Saml. Cutler & Sons, Ltd.

39, *Victoria Street, Westminster, S.W.*1.
Aug. 13, 1918.

Vertical Retorts *v.* Low-Temperature Carbonization.

Sir,—Mr. Glover in his letter of the 9th inst., quite misinterprets my letter of July 24. I did not state that the gas industry was playing about with the subject of carbonizing cannel coals in continuous vertical retorts. I said I was not in favour of playing about with the gas industry—that is, to make gas-works into low-temperature carbonizing plant.

I am perfectly well aware, and quite agree with Mr. Glover, that low-temperature products are obtained in vertical retorts which are heated to high temperatures. The reason for this is that quite a large amount of steam is injected into the retorts, which carries away the products of the destructive distillation of the coal rapidly; so that these products are prevented from any considerable contact with the highly-heated sides of the retort.

Mr. Glover must admit that the residues obtained from most cannel coals when passed through the vertical retorts and subjected to heavy steaming are of very little value except for the dump-heap. Unless a portion of the free carbon in the coke were converted by the steam into blue water gas, it would not be possible to obtain sufficient gas for the gas-works requirements. In any case, the amount of fixed carbon in cannel residues after the volatile matter has been driven off is never high; and by converting a portion into gas it becomes still lower.

In low-temperature processes, only sufficient gas to heat the retort settings is obtained even from bituminous coals; but from bituminous coals a valuable fuel is obtained beside the high yield of oil. I do not know, however, how bituminous coals would work in vertical retorts under conditions which have been used with the cannel coals, as I have not the experience. But I doubt whether the oil yield would be so satisfactory as when bituminous coals are carbonized in low-temperature plant.

F. Mollwo Perkin.

59, *New Oxford Street, W.C., Aug.* 16, 1918.

The Royal Society and Enemy Alien Members.

Sir,—In your issue for Aug. 13, you quote (on p. 294) a resolution recently submitted to a meeting of the Fellows of the Royal Society; but you are in error in stating that it was adopted. The resolution actually approved by the meeting was as follows:

> **That the delegates of the Royal Society at the forthcoming conference between representatives of the Academies of Allied countries should raise the question of the expulsion of enemy foreign members with a view of eliciting the opinion of the conference as to the desirability of joint action, and that the subject be reconsidered at a future meeting of the Society on the report of the delegates.**

The question is therefore still *sub judice*.

Robert Harrison,
Assist. Sec. Royal Society.

Burlington House, London, W., Aug. 17, 1918.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Aug. 14.]

Nos. 12,721—13,029.

Aldridge, J. G. W.—"Stoking machines for gas-retorts." No. 12,977.
Barrow, L.—"Suction gas producers." No. 12,759.
Boys, C. V.—"Means for amplifying sound." No. 12,863.
Cadbury Bros.—"Suction gas producers." No. 12,759.
Everett, S.—"Treating carbonaceous materials." No. 12,875.
Heise, O. A. L.—"Gas-purifiers." No. 13,017.
Heise, O. A. L.—"Fire-place for generators." No. 13,018.
Heise, O. A. L.—"Preheater for gas generators." No. 13,019.
Heise, O. A. L.—"Gas generators." No. 13,020.
Hislop, G. R.—"Gas manufacture." No. 12,955.
Keith, G.—"Gas lighting system." No. 13,001.
Keith, J.—"Gas lighting system." No. 13,001.
Letts, G. K.—"Gas or fire economizer." No. 12,866.
Phillips, T.—"Tubular condensers." No. 12,845.
Phillips, T.—"Mechanical retorts or heating-chambers." No. 12,846.
Prat, L.—"Regulating temperature of gases in fans for induced draught." No. 12,816.
Quick, H. M.—"Lamp globes." No. 12,993.
Simpson, R. M.—"Gas manufacture." No. 12,955.
Soc. Anon. des Produits Refractaires de l'Ouest.—"Manufacture of silicia bricks." No. 12,788.
South Durham Steel and Iron Company.—"Chequer bricks for regenerator chambers of furnaces, &c." No. 12,978.
White, J. W.—"Telphers." No. 12,927.
Williams, T.—"Chequer bricks for regenerator chambers of furnaces, &c." No. 12,978.

Watford Gas Company.—At Thursday's meeting of this Company the Directors will report that for the half year to June 30 increases in wages and the constantly rising prices of all materials left the Board no option other than to increase the price of gas by 8d. per 1000 c.ft. as from July 1. The revenue account shows a profit of £3831, and profit and loss, after providing for interest on mortgages, deposits and loans, a balance of £2665. The statutory dividends are recommended as follows: Upon the A capital stock at the rate of £6 12s. 6d. p.ct. per annum and on the B capital stock at the rate of £5 2s. 6d. p.ct. per annum—less tax. These dividends will require a contribution from the reserve fund.

A Heroic Gas Worker.—At the Enfield Police Court last week, Col. Bowles (the Chairman) presented to William Watson, of 501, Caledonion Road, Holloway, a silver medal and a cheque for five guineas, awarded by the Society for the Protection of Life from Fire, for an act of heroism at the Ponders End Gas-Works last March. Watson and a comrade, named Doo, were working inside a large station meter, when a gas-jet they were using fell into some naphthalene, which burst into flames. In spite of severe injuries, Watson made every effort to rescue his comrade, and only gave up the attempt when he was compelled to do so by his own extending injuries. The body of Doo was discovered four hours later. At the inquest, the Coroner expressed to Watson, on behalf of the jury, their cordial appreciation of his heroism; and the facts were brought to the notice of the Society. Col. Bowles said they often read records of gallantry and bravery in the field—deeds very often performed under exciting conditions. He felt that deeds of bravery under such circumstances as existed in this case, where a man forgot his own self-interests and tried to help a comrade, ranked highest in our history.

MISCELLANEOUS NEWS.

SOUTH METROPOLITAN GAS COMPANY.

The Ordinary Half-Yearly Meeting of the Proprietors of this Company was held on Wednesday last at the Cannon Street Hotel—Mr. CHARLES CARPENTER, D.Sc., in the chair.

The SECRETARY (Mr. F. M'Leod) read the advertisement convening the meeting, and the minutes of the last ordinary and extraordinary general meetings. The seal of the Company was affixed to the Register of Proprietors, and the report and accounts were taken as read.

THE CHAIRMAN'S ADDRESS.

The CHAIRMAN said: Ladies and gentlemen, in formally moving the adoption of the report and accounts for the past half year, I propose to deal for the most part in general terms with our position rather than troubling you with many details of the working, which, as the report informs you, are now so largely beyond our control. As most of you are aware, the Board of Trade is the department of the Government responsible for those legislative enactments which control the working of statutory gas companies. It often fixes their sliding-scales, and, in the Metropolis, does much more than this; for it carries on a running audit of their accounts, and appoints highly-qualified scientific men who are charged with the duty of prescribing the conditions necessary to keep a continuous valuation of the quality, the purity, and the pressure of the gas supply. Remembering this, I must say that I was surprised the other day when a former President of the Board of Trade stated in the House of Commons that, during his lifetime as a public man, the sliding-scale was one of the three things he had never wasted his time by trying to understand. Now, this want of knowledge is, I fear, shared by many who have not had the same opportunities for acquiring it. I propose, therefore, to devote a few minutes to the purpose of explaining the origin and working of the sliding-scale. In the middle of the "forties" of the last century, Parliament applied to what were then the three chief branches of public utility undertakings—namely, railways, gas, and water—an authorization up to 10 p.ct. as the amount of dividend it was thought fair they should pay; and upon the strength of this authorization the railways and gas and water supplies of the kingdom were for the main part developed. To some extent they competed with one another in their respective spheres. Perhaps that is hardly true of water undertakings; but it is of gas and railway undertakings. In the case of gas, the inconvenience concomitant was such that in 1860 the Metropolis was partitioned, and the various undertakings were allotted defined areas of supply. I think it will perhaps be equally true to say that they then went more or less to sleep, in the business sense of the word, with two notable exceptions—the Commercial Gas Company supplying the north side of the river, and this Company on the south. Fifteen years later, the Metropolitan Board of Works endeavoured to obtain a reduction of the 10 p.ct. limitation of dividend; but the Government of the day emphatically set its face against what it described as a breach of faith with those who had subscribed capital for the purpose of developing these public utility undertakings.

HISTORY OF THE SLIDING-SCALE.

My predecessor in this chair, the late Sir George Livesey, proposed a sliding-scale as one of the ways out of the difficulty of conducting gas affairs at that time. This met with the warm approval of the Board of Trade; and its application was very strongly recommended by a Committee of Parliament which sat under the chairmanship of the Right Hon. W. E. Forster. It was recommended because it afforded the only practical means which he, as a business man, could find of rewarding good management and placing a fine on bad management. The 10 p.ct. dividend was taken as the standard, and in conjunction with it the standard price of gas was taken, in the case of this Company, at 3s. 6d. per 1000 c.ft. North of the Thames the price was higher; but the 3s. 6d. was the one at which we worked. For every penny below this price at which gas was sold an extra ¼ p.ct. dividend was allowed above the 10 p.ct., and for every penny above 3s. 6d. ¼ p.ct. was knocked off the dividend. This is the whole sum and substance of the sliding-scale, the understanding of which proved impossible to a former President of the Board of Trade. The next important matter in connection with it is that concomitant with its adoption was made another important recommendation—namely, that all future issues of capital should be by auction or tender instead of by allotment, and that any premiums obtained should be used for the purposes of capital in the business, and, of course, would bear no interest. It is forty-two years since Mr. Forster's Committee sat. During these forty-two years our business has trebled in extent; and by means of the penny-in-the-slot meter the conveniences of gas have been made available for the working-class section of the Metropolis. I now want to deal shortly with the manner in which the capital necessary for this purpose—for developments of the kind and magnitude I have just described—was provided. In the first twenty years of this period we issued a quarter of a million stock. Nominally, it was 10 p.ct.—actually, it was a slight fraction above 4 p.ct., because this quarter of a million of stock actually brought us in £612,835. This great difference between the nominal and the actual values of our stock was found to discourage small investors among the general public, and also the employees of the Company, from taking it up. It was therefore decided to convert it to a basis more in accord with its value—namely, 4 p.ct. This change was made in 1896, since which time we have issued £1,134,690 of what was nominally 4 p.ct. stock, yet actually 3⅛ p.ct., since it brought us in £1,347,399 of capital moneys. Six months ago, you gave your approval to a Bill we had deposited, the object of which was to maintain during, and for two years after the war, this modest return upon the capital of which I have spoken. Our case, and that of other gas undertakings, was heard by a Select Committee appointed by the House of Commons under the chairmanship of Sir William Middlebrook. The application for some relief was strongly opposed by the London County Council. I think I ought to give you some idea of the nature of this opposition by extracts from the evidence of their three witnesses. They affirmed that it would not interfere with the financial stability of gas undertakings if they paid no dividend at all during the war; that a gas undertaking during war and paying no dividend could issue stock at a premium; and, finally, that the present state of things was foreseen when the sliding-scale was fixed. That the case for relief was proved up to the hilt is borne out by the conclusions at which the Committee arrived. They reported: "The conclusion your Committee have unanimously come to is, therefore, that some provision should be made for the temporary modification of statutory requirements with regard to price and dividend in the case of gas undertakings whose financial circumstances have been so seriously affected as to call for intervention." The Committee, however, expressed themselves as finding the greatest difficulty in formulating the terms and conditions of relief, owing to the differing conditions of every case; and I cannot help feeling that this was responsible for the utter inadequacy of the proposed relief. As you know, we appealed for its modification to the House of Commons itself. For this both we and our employees have been blamed, on the score that there was no one to speak for the gas-using public. As regards the first suggestion—the blaming of our employees—considering that they have provided something like half-a-million of capital, I think they were perfectly justified in bringing home to the members of the House their particular hardships; and as regards the latter suggestion, I can only say that no body of gas consumers ever has had, and I hope never will have, a more faithful representative of their interests than this Company has shown itself worthy to be regarded for many years past. The amended relief given as the result of a somewhat acrimonious discussion is little enough in all conscience. Had it been extended to three-quarters of the pre-war dividend—and for which I certainly think some members thought they were voting—the settlement would have had greater claim to be considered just, and would have compared less unfavourably with the war-time consideration given to other vital industries. I hope I have said enough to combat one of the most unfair accusations ever made against gas undertakings—that they were exploiting the war for their own selfish purposes.

FUEL RATIONING ORDER.

The next matter to which I ought to refer is the fuel-rationing proposals. Here no suggestion can be made that my remarks are in any way biased, because, however disastrous the proposals may prove to gas suppliers, a minimum dividend of the kind to which I have referred has been assured. The cause of the shortage of coal supply is well known. At any rate, the proposed rationing is, I think, admitted by everyone as a step which is very necessary in order to make use of the available supply of coal. It does seem unfortunate that there have been no methods, such as we have ourselves practised for so many years, of bringing home to the miners the great importance of their industry at all times—certainly not less at the present time. Yet here I have a report from one of the coal-mining counties of England—I do not know if I am infringing "D.O.R.A." in referring to it—which speaks of the serious situation that has arisen by the coal miners having stopped work on many occasions without consulting their Unions or giving their Unions an opportunity of discussing differences with the management. I cannot help thinking that, if we all agree with the necessity for it—if coal and gas and electricity are to be rationed—I cannot but think that something might have been done by making the rationing on a basis of the consumption, as was originally proposed, in either 1916 or 1917, whichever might be the greater. It certainly would have simplified enormously the machinery required to carry the rationing into effect. A plan of this kind was actually put into operation, but was abandoned before it got into full working order. When the need for rationing came, we said: It is for you to say by how much you want the consumption reduced. If you want it reduced by 20 p.ct., then provide the undertakings with 20 p.ct. less fuel than they had in 1916 or 1917, and leave it to them to carry that out with the least possible inconvenience to the public; and as the various gas undertakings are in close touch with the public—as is the case of electricity undertakings with their public, and coal undertakings with theirs—it seems to me that much might have been done in this way. However, as I say, we got a substantial reduction—not quite to the full extent of what was required, but we only had a few weeks to get it in order; and in a matter of this kind it naturally takes some time before one can get simplified machinery even of this kind in thorough working order. In connection with this, I might say that more than two years ago I drew the attention of the authorities to the fact that our enemy had ordered all raw coal possible to be retorted before use. I suppose to-day even the "man in the street" understands the importance of coal bye-products in the conduct of the war and for the relief of tonnage. In face of this, it does seem rather remarkable that, after four years of war, we should be in the position of hearing raw coal advocated in preference to other fuels Our Navy and Army are large users of liquid fuels, both heavy and light. Much of this has got to be imported from overseas; and I suppose it is true to say that the nation is not yet out of danger with regard to the tonnage question. I should have thought that the carbonization of coal, by which these bye-products are conserved, would be encouraged as much as possible, or, at any rate, alternatively, that the use of raw coal should be strongly discouraged. Yet this does not appear to have come home to everyone. I have a circular here which says the most cheerful and healthy and economical method of cooking and heating is, as it has always been, coal. This is what a member of the Government says. I think it is our duty to be cheerful in a more serious way than by using raw coal at the present moment if it can be avoided. I think I might go further and say that anybody who uses raw coal when he can use gas is doing something to help the enemy.

A WAGES BILL OF OVER A MILLION.

Another matter of importance to which I must refer is labour costs. Those of you who followed the comparative figures for 1914 will have noticed that whereas we paid in wages at the rate of something like £611,000 a year, we are now spending at the rate of over £1,000,000—as a matter of fact, £1,022,000. Some of this increase is no doubt justified by the increased cost of living, but certainly not the whole of

it. Unfortunately, the Government calls the tune, and we have to pay the piper; for the Government is to-day, of course, the largest employer of labour. As you will remember, we have had for the last 28 years a Co-Partnership Committee of the kind recommended in the Whitley report. This Committee consists of half officials and half employees—the latter elected by ballot. I may say that it has often puzzled me why the Whitley Committee never invited us to give evidence before it. We have had very long practical experience of the matter. This experience is known to a great many people, and I think would have helped to fortify the conclusions of the Committee; but, for some curious reason, it seemed to have ruled-out any inquiry as to the working of co-partnership. I am pleased to say—and I think I ought to bear acknowledgment of the fact—that when this omission was pointed out to the Minister of Reconstruction, he promised that sympathetic consideration should be given to it in connection with post-war problems. It is unfortunately true that there are some in public life who will never forgive the Company, and never forgive its employees, for having worked in harmonious relationship for twenty-eight years. The help of the Co-Partnership Committee has been invaluable in dealing with problems of labour and wages; and in this connection I should like to say a word as to its attitude on the 12½ p.ct. bonus, the demand for which has spread like a disease throughout the land. In due course this appeared among the London Gas Companies, north and south of the river. It was discussed by our Co-Partnership Committee on more than one occasion; and they felt that they could not press for its adoption by this Company, on the ground that they felt it would tend to damage the business in which they were interested, and that it would place an unfair burden upon the already heavily burdened gas consumer. Unfortunately, circumstances have since proved too strong for them; for the bonus is added to the current rate of wages throughout the whole of London, and they have at last decided to recommend that we should conform with the general practice. It is a very difficult position. I am sure you will all understand that when you once take up a position of doing something less than other people—paying less than the standard rate of wages—it is not an easy position when one decides to put it on one side and to do something else. I think every credit is due to the Co-Partnership Committee, and to those who supported them in their action, for endeavouring however in the long run unsuccessfully, to stand up against that kind of excessive wages which is at the present time endangering us, and which in future I feel will endanger us still more.

COAL STOCKS.

There is one other matter to which I ought to refer. It is a matter of great importance; and therefore I think you should be fully taken into our confidence on this occasion. It is with respect to the stocks of coal, the continued depletion of which is causing us the very greatest anxiety for next winter. As I think you have been told on previous occasions, it is our custom to build-up during summer time the coal stocks we require to draw on for maintaining our winter requirements. We ourselves are now helpless in the matter of our supplies, because they are wholly taken over by the department of the Coal Controller; and as it is no more possible to make gas without coal than it is to make bricks without straw, if any disaster comes in the case of a breakdown in gas supply the responsibility will not be ours. The facts seemed to us to be sufficiently serious to warrant our bringing them under the notice of those who are delegated to look after the interests of London, including the members of Parliament for the Metropolis; and from letters we have had, I think I may say that they were fully alive to the seriousness of the position. We are now getting coal from all parts of the kingdom—and extremely poor stuff some of it is. But still, it is coal. There seems to be an impression in the minds of some persons that so long as it is coal it does not matter. For your information, however, I may tell you that some coal produces 5000 or 6000 c.ft. of gas for every ton, and some of it twice or two-and-a-half times as much as that. So that when dealing with transport over considerable distances, it is important, as far as possible, to transport the genuine article. In this connection I am pleased to be able to acknowledge that the quality of the coal from our main, or what we at any rate in the past have called our main, area of supply—shows distinct signs of improvement. I think I mentioned six months or a year ago that the amount of rubbish we were then receiving in the coal was such that one collier did the equivalent of nothing more than going between London and the Tyne carrying rubbish. This will give you some idea of the magnitude of the question of having the coal properly picked. I think I also told you what was the trouble at the time—that the miners had set their face against the employment of female labour. Well, those are the general facts that I think it my duty to bring before your notice this afternoon. There may be other matters which may appeal to you as shareholders; and I should be pleased to answer them.

A WORD FOR THE EMPLOYEES.

I do not think, however, that I can conclude without bearing testimony to the splendid manner in which the employees, male and female, are working for us at this time of exceptional difficulty; and I think I must again make special reference to what has been done in the way of substituting female labour for male labour. It is sometimes suggested that it is more expensive. I remember that 29 years ago you poured out your money without stint on a question which was one between right and wrong—the question whether three men should be turned out of the Company or kept in it. You stood up for the right then; but it cost you, as far as I remember, about £120,000. I do not think I am wrong in assuming that, at a time like this, when it is costing something to train female labour, it is equally your wish that this cost should be incurred. It is impossible to open the gates of the various works and to let in so many women without spending money on their training. One has to expend a certain amount in training them up in the various departments to standard efficiency. When this is done, they are, in their sphere, as competent as men to do their work; and they do it equally as well. Whether they are put in the retort-house or the purifiers, they get the same amount of money for their work that is paid for male labour. The output per woman is, of course, less; but the cost to the Company is the same. It is quite true that we have had to do something in the way of lightening the apparatus and tools with which they work; and, as I have said, the cost of training, and the time of training, is more than it would be under ordinary circumstances. In ordinary circumstances you have not such enormous changes in the *personnel* of the work as you have at the present time. The point is that when they are trained they do their work exceedingly well; and they have enabled us to release many men, and to place their services at the disposal of the country, who would otherwise be engaged in the various works. I think I may also say that we have as far as possible taken every precaution with regard to the question of health. We have a consulting female physician; and her report is that the women thrive on their work. This is quite an unbiased and impartial opinion. So that having got this, I think you will understand that we feel we are perfectly safe in continuing, and extending as far as we possibly can, the substitution by female labour of the men who are of military age employed in our various works. I cannot but feel, too, that the inside knowledge which these women are acquiring first hand of the industrial conditions of employment will prove very useful when the boys come back. I formally move—"That the report and accounts now presented be received and adopted, and the report entered on the minutes.

The Deputy-Chairman (Mr. Frank H. Jones) having seconded the motion,

The Chairman invited discussion.

Remarks by Shareholders.

Mr. Havelock West thought that the report was not quite satisfactory, as on the last occasion £56,000 had to be taken from reserve to pay the statutory dividend, and now £23,303 was to be taken. He was pleased to hear the Chairman's remarks about the sliding-scale, which he thought would go to remove much misapprehension on the subject. With regard to the item of £87,287 in the suspense account, he should like to know whether they had any more steamers, or whether they were hiring them. Another item which required some elucidation was the amount invested in the reserve and insurance funds (£40,000). Perhaps the Chairman in his reply would state what these investments consisted of. He believed the fuel rationing would put the Company to a great deal of expense, as meters would have to be examined weekly instead of quarterly. He should also like to know whether they would have to touch the reserve again to maintain the dividend.

The Chairman: With regard to the reserve fund, I would remind you that what we have to do is to make up our mind at the beginning of the half year as to what we need to carry us through the six months end to pay the dividend. This forecast is made to the best of our ability; and in the present case it would have been quite right but for the Coal Controller's Order. The reserve fund cannot be put to a better purpose than levelling dividends As to what will happen under the new Act, all I can say is that, so far as I can see, it will enable us to pay 3 p.ct., without having recourse to the reserve fund. Suppose we find we have a deficit at the end of the half year, I imagine we should still be allowed to pay three-fourths per cent. and carry the deficit forward to be met by increasing the price of gas in the following six months. With regard to the suspense account, that is money paid in respect of lost tonnage, and which will be available for replacing lost tonnage, when that can be brought about. At the present time our tonnage is considerably less than it was six months ago; the reason being that, in the interests of the nation, it had been found absolutely essential to use, in the general interest rather than in the particular one, railways for bringing coal to London. Instead of using ships to bring coal from the Tyne to London, it has been brought by rail, and the ships have taken the fuel to our allies. As to the allowance in respect of meters, it is certain there will be some extra cost in carrying out our share of the requirements of the Coal Controller; and although the figure has not been settled, there is a feeling on the part of the authorities that some portion of the expense should be borne by them. The reply is that the authorities have adopted the principle without settling the detail. As to the question as to what the money is invested in, my answer is that it is invested in what are known as gilt-edged securities; and any shareholder can inspect the list at the head office. The securities have been gone through with extreme care by our own Auditors and by the Official Auditors who are working under the authority of the Board of Trade.

The motion was then put and carried unanimously.

The Dividend.

The Chairman: I have now to move:

> **"That dividends as follows for the half year ended June 30 last be now declared—viz., on the 5 p.ct. redeemable preference stock at the rate of £5 p.ct. per annum; on the ordinary stock at the rate of £3 4s. p.ct. per annum; and that the warrants be transmitted to the registered addresses of the proprietors by post."**

Mr. John Mews, in seconding the motion, said, with regard to the management of the Company, there had certainly been during the half year a great deal of difficulty. Wages had increased, and there had been much difficulty in obtaining supplies of coal. With regard to residuals, there was no free market—practically everything was controlled. In the case of sulphate of ammonia, if they were able to sell it out of England they could get double the price they were now receiving.

The motion was put and carried unanimously.

The Chairman: Ladies and gentlemen, that concludes the business.

Votes of Thanks.

Mr. Chas. Webb proposed a hearty vote of thanks to the Board of Directors, who had had most strenuous times to pass through.

The motion was seconded and carried unanimously.

Mr. W. R. Lee expressed a hope, as rumours had been freely circulated that the Company were exploiting the war for their own selfish purposes, and were profiteering, that the Directors should issue a circular stating the facts of the case, which he thought would go far to dispel the prevailing idea about gas companies being benefited by the war.

The Chairman: It is very pleasing to the Board to hear such an

eminently practical suggestion coming from the body of the hall. I may say we propose to carry out an idea of that kind upon the next occasion when it will be necessary to increase the price of gas. It will be imperative to raise the price of gas at Michaelmas; and it has been thought that would be a good opportunity to bring home to consumers that we are not the profiteerers that people who ought to know better have charged us with being. We have had many letters on the subject. One came yesterday from a widow, who stated that her husband had invested his savings in gas stock, that she had lately been assisting two daughters, but that, owing to the reduction in the dividend, she found it difficult to keep the roof above her own head and that she was not now in a position to give any help to her daughters. There are many cases of hardship which give the lie to the suggestion that gas companies are exploiting the war for their selfish ends. For your vote of thanks to the Board I thank you very heartily. We have never had such trying times as those through which we are now passing; and in dealing with the various problems week by week, we are looking forward to the future that we may not be behind when the time comes to put into practical effect some of the lessons which the war has taught us. Before sitting down, I should like to propose a vote of thanks to the staff. It is not possible to discriminate when all have done so much to help the Company in these times of trial and difficulty. If I asked for one class to have the benefit of the vote more than another class, it would be to those who have done so much in the way of developing the dilution of labour by training women. This task has been a most remarkable one. We have had deputations from all over the country who came to scoff, but were converted to the seriousness of what we are doing—in fact, they came to the conclusion that there is no reason why women should not carry on the work during the time the men are away. The members of the deputations have gone away with the idea that there is very little in a gas-works that women cannot do. This has not come about automatically, but as the result of systematic teaching.

The motion was put and carried unanimously.

The CHIEF ENGINEER (Mr. G. M. Gill), on behalf of the technical staff, acknowledged the vote of thanks, and said in their Company there had been more dilution by female labour than in any other gas company, which was due to the efforts of the technical staff. As time went on their difficulties would not grow less; but they were daily receiving proof of the loyalty of the staff, for which those who had to control the management of the Company were sincerely grateful. He heartily thanked his colleagues and assistants who had helped them very much during the past six months.

The SECRETARY (Mr. F. M'Leod) responded for the clerical and commercial staff. He remarked that 3600 of the Company's employees of all ranks had joined H.M. Forces; and it was certain that such a large number could not have been released but for the substitution of female workers. The depleted staff, loyally assisted by capable helpers, both male and female, were carrying on most worthily—determined that no effort should be spared in their desire to preserve the interests of the Company and those of their absent colleagues. Their endeavours would be encouraged by the shareholders' vote; and, on behalf of all concerned, he cordially thanked the meeting.

The proceedings then terminated.

COMMERCIAL GAS COMPANY.

The Ordinary Meeting of the Company was held last Thursday, at the Cannon Street Hotel, E.C.—Mr. W. G. BRADSHAW in the chair.

The SECRETARY (Mr. F. J. Bradfield) read the notice calling the meeting; and the Directors' report and the statement of accounts were taken as read.

THE "RELIEF" ACT, AND THE STABILITY OF GAS UNDERTAKINGS.

The CHAIRMAN, in moving the adoption of the report and accounts, said: We meet you to-day having experienced four years of the greatest and most far-reaching war in the history of mankind. It is safe to say that no country and very few individuals throughout the world have escaped its effects. We are only concerned here with the results to our Company; but they meet us at every turn, and difficulties tend to increase as time goes on. Your last act when we met you in February was to authorize us to promote a Bill in Parliament, the principal objects of which were to raise more capital, and to enable the Company to pay larger dividends than those authorized by the sliding-scale. Some 25 other gas companies also applied to Parliament for similar powers. You will have seen in the Public Press that the Board of Trade decided to obtain the appointment of a Select Committee of the House of Commons to inquire whether any, and if so what, relief should be given to gas shareholders, and on what terms and conditions. The Committee sat and heard evidence on behalf of, and against, the gas companies, and finally reported to the House that, "with a view of maintaining in the public interest the stability of gas undertakings, some provision should be made for the temporary modification of statutory requirements with regard to price and dividend in the case of gas undertakings whose financial circumstances had been injuriously affected by causes arising out of the war." The Committee then recommended that the companies should be entitled to charge such price for gas as might be held by the Board of Trade to be sufficient to provide the cost of the manufacture and distribution of the gas, and a dividend of one-half the standard or one-half the pre-war dividend, whichever should be the smaller. These provisions were to have effect during the continuance of the war, and for one year after its termination, and for such further period as the Board of Trade might by Provisional Order determine. The Board of Trade thereupon introduced a Bill to carry these recommendations into effect, with some slight modifications. But the House of Commons at once recognized that, inasmuch as the sliding-scale provisions had been fixed to secure good management under normal conditions, it would be grossly unfair to the people who had supplied capital to establish and maintain gas undertakings if the scale were made to apply rigidly to war conditions, which were totally unforeseen when the scale was fixed with the authority of Parliament. The House saw the utter inadequacy of the relief proposed; and, in spite of very strenuous opposition, by large majorities they enlarged the minimum dividend to three-quarters of the standard or pre-war dividend, whichever should be the smaller, and extended the period during which the relief should be granted to two years after the end of the war. The result of this is that the Board of Trade may, if they think fit, by Order provide for the modification of the statutory provisions regulating the charges to be made by the Company so as to enable us to pay a minimum dividend of 3 p.ct. upon the 4 p.ct. stock and £2 12s. 6d. p.ct. upon the 3½ p.ct. stock. The relief thus afforded to the shareholders is meagre in the extreme [Hear, hear.], and is altogether insufficient to secure the avowed object of the Committee—viz., the stability of gas undertakings. I cannot imagine that the prospect of a minimum dividend of 3 p.ct. in times of abnormal difficulty will attract investors to put their money into gas companies' stock. The inevitable result of the inadequacy of the relief given will be that money for gas undertakings will in future have to be raised at a higher rate of interest than in the past; and the price of gas will be permanently kept up, to the detriment of hundreds of thousands of consumers of the poorer classes. This position might have been avoided by a more statesmanlike view of the situation on the part of the public authorities. There is a good deal to be said for the argument that because the Government have fixed their own price for the residual products they take for the manufacture of explosives, and because this price is much below the market value, that the cost of the relief granted to the shareholders should at any rate in part fall upon public funds, and not upon the consumers of gas. But while this view was put forward in the House of Lords, it was not prominently advanced by the opponents of the Board of Trade Relief Bill in the House of Commons. It is clear that the situation cannot remain as it is. The position of gas undertakings must be reviewed, and dealt with in a broader and wiser spirit. The maintenance of an adequate supply of gas is of such vital importance to the nation as a whole as well as to all classes of the community, but more especially to the working classes and industrial concerns, that capital invested in gas undertakings must be made secure of a fair return even in times of stress and difficulty. If the companies had been left to themselves without Government intervention, they would probably have been in a far better position than they are to-day. The fact that the Government have intervened, and regulate nearly all the operations of the companies, surely implies an obligation to see that the proprietors do not unduly suffer. Is it just or in the national interest that Government intervention should contribute to the reduction of the gas companies' dividends to starvation point, while it has enabled the railway companies not only to maintain, but even in some cases to increase, their pre-war dividends? It is true that the railway companies have rendered enormous services to the nation during the war; but it is also true that the war could not be carried on without the supply of high explosives manufactured from the gas companies' products. If the railways transport the soldiers to the field of action, the gas companies give them the means of fighting the enemy when they get there. I have no hesitation in saying that, but for the assistance of the gas companies, the war would long ago have ended in a German peace. It cannot too often be pointed out that the consumer is not paying the market value of the article he buys. The market value is the cost of production *plus* a fair return on the capital employed in the business. If for any national reason it is considered that the consumer of gas or the purchaser of any of the companies' products should be supplied at less than the market value, then the cost should be borne by the nation, and not by a small section of it.

THE COMPANY'S BILL AND AN APPLICATION UNDER THE RELIEF ACT.

The Company's Bill was read a second time, with an instruction that the clause relating to dividends should be struck out on the Committee stage. We had no option in the circumstances but to agree to this. Thereupon the London County Council and the West Ham Corporation who had petitioned against the Bill withdrew their opposition; and the Bill proceeded unopposed. It has passed the Committee stage in the House of Commons; and, after being read a third time after the recess, it will go to the House of Lords as an unopposed measure. The financial relief which Parliament has granted us, although it is very much less than we asked for, and in my opinion smaller than the justice of the case required, will nevertheless save some companies from losing their dividends altogether. In our own case, there is very little doubt that we shall have to take advantage of it in the case of both our stocks. Indeed, at the current price of gas, which is 3s. 10d. per 1000 c.ft., the statutory dividend on our 3½ p.ct. stock is only £2 6s. 8d., against the minimum dividend of £2 12s. 6d. authorized by the new Act.

THE CONDITIONS OF WORKING—COAL AND OIL.

Now let us examine briefly the conditions under which we are working. As you are aware, the price of coal is controlled by Government. For the June half of 1914, coal cost 13s. 8d. per ton f.o.b. in the Tyne; and it cost us for freight and shipping charges 4s. per ton—together 17s. 8d. per ton of coal brought into the Thames. For the June half of 1918, coal cost 19s. 6d. per ton f.o.b. in the North (an increase of 42 p.ct.), and carriage to the Thames 15s. 11d. per ton (an increase of 300 p.ct.)—together, 35s. 5d. per ton into the Thames, which is an increase of 100 p.ct. A further increase in the price of coal has since been authorized by the Government of 2s. 6d. per ton as from June 24 and an additional 1s. 6d. per ton as from July 8, making 10s. 6d. per ton increase f.o.b. on the pre-war prices. In like manner, oil, which in June, 1914, was costing us 3¾d. per gallon, cost us last half year nearly 1s. 3d.—the cost of the oil having risen by 59 p.ct. The freight which before the war was under 1d. per gallon has advanced to over 10d. per gallon—an increase of no less than 1018 p.ct. The present fixed price is 1s. 4d. per gallon. In 1909, we were obtaining the same oil for less than 2d. per gallon.

LABOUR AND WAGES AND SALARIES.

As regards labour, up to March last, a war bonus, afterwards converted into a war wage, of 15s. a week had been given to all classes of the Company's workpeople. The General Workers' Union then made

a formal application to the Government for a further increase. This was referred by the Government to the Committee on Production, presided over by Sir George Gibb; and they awarded a further war wage of 4s. a week, making the total war wage up to 19s. a week, which was to be taken into account in calculating overtime. In addition, the 12½ p.ct. bonus on the aggregate wages was awarded to all their workers, except the piece workers, who were to receive 7½ p.ct. The extra cost to the Company of this award is approximately £40,000 a year, which is equivalent to nearly 3d. per 1000 c.ft. on the price of gas. The aggregate sum paid by the Company for salaries and wages in 1913 was £137,910; and for dividend to stockholders, £112,593. In 1917, salaries and wages amounted to £213,428, and the dividend to £86,633—that is, an increase of £75,518 in salaries and wages, and a decrease of £26,560 in dividend. We estimate that the salaries and wages for 1918 will be £250,000; and the dividend will not exceed £71,278. Besides the increases in the price of coal and oil, and the sums paid for salaries and wages, we have to meet a rise in the cost of various other materials used on the works, varying from 33 to 316 p.ct., while on the receipts side of our revenue account, owing to Government restrictions, the price of residual products has risen by only about 65 p.ct. In order therefore to make a profit, we are driven to the necessity of increasing the price of gas, the effect of which is to reduce the dividends.

GAS RATIONING.

The Rationing of Fuel and Lighting Order, if successful, will tend to reduce the quantity of gas sold, and will thereby increase the burden of the Company's standing charges and diminish the amount available for dividend. The first Order, called the Lighting, Heating, and Power Order of March 25, 1918, imposed upon consumers a reduction of one-sixth of the amount of gas or electricity consumed during the corresponding quarters of the years 1916 and 1917, whichever was the greater. This Order has been superseded by the Household Fuel and Lighting Order of June 28, 1918, under which a scale of fuel allowances is imposed regulating the consumption of coal, gas, and electricity, according to the number of occupied rooms in the house. It is impossible to say what effect this Order will have upon the Company; but as the whole of the prepayment meter consumers are unaffected by it, and a large number of ordinary consumers are also exempt by reason of their consumption of fuel exceeding 100 tons per annum, we do not anticipate that the Company's sales will be greatly affected. It is a curious fact that after the Lighting and Heating Order was issued in March, there was a noticeable improvement in the output of gas. In the first three months of the year, there was an average decrease of 8½ p.ct. in the output, but in the second three months the decrease fell to an average of 2½ p.ct. I cannot explain this, but there it is. The sales of gas were less during the half year under consideration than in the corresponding half of the year 1917 by 4½ p.ct., although previously there had been a steady increase since 1914. The decrease was practically all in the gas sold through ordinary meters, and is to be attributed to the fact that the coming into operation of the large new Government munitions factories all over the kingdom has lessened the work given to the small private factories.

THE WAR REDUCTION OF SHIPPING CAPACITY.

The delays which occur to our ships get more frequent in spite of the improvement in the submarine position; and to add to our difficulties one of our ships the *S.S. Teeswood* was requisitioned for Government service on April 1. We are also meeting with delays at the collieries, and cannot get our ships loaded. Up to this year we have always had good dispatch from the collieries. In pre-war days, each of our ships made a minimum of thirty trips each half year to the North and back again. In the first half of 1917, eight ships averaged 21·2 voyages per ship. In the second half of 1917, eight ships averaged 17·7 voyages per ship. In the past half year, eight ships averaged 14·3 voyages per ship. The normal carrying capacity of the ships is 201,000 tons a half year; but they actually carried last half year only 99,775 tons.

COAL AND OIL SUPPLIES AND NEXT WINTER.

One of our chief causes—I think our chief cause—of anxiety at the present time is due to the state of our coal and oil stocks. We contracted early in the year for our full requirements of coal; but we have not been able to obtain the quantity provided for. We have now in stock little more than half the quantity which we had last year; and the Coal Controller had allotted to us only 183,000 tons for the year, which is 37,000 tons short of our minimum requirements. He proposes that we shall commence the winter with a stock of about 30,000 tons, which is altogether inadequate. Last year when we had eight ships running under better conditions than obtain now, we commenced the winter with a stock of over 50,000 tons; and our stock was reduced by 35,000 tons during the six winter months. But this year we have only seven ships, and the delays are far worse than last year. Then, as regards gas oil, we use in ordinary times 10,000 tons, or 2,600,000 gallons a year. We applied to the Department of the Ministry of Munitions which controls oil supplies for a minimum quantity of 1,500,000 gallons, which, with our stock, would probably have enabled us to get through the year; but we were awarded only 813,000 gallons. These quantities of coal and oil are insufficient to enable us to keep up the supply of gas required by our consumers; and it will be impossible to maintain the quality of it. Moreover, if stocks run short in mid-winter, it is very difficult to replenish them, even if we are permitted to do so. We have made the strongest representations to the responsible authorities, but so far without any satisfactory result. I must say I view the coming of the winter season with much apprehension.

POINTS FROM THE ACCOUNTS.

There is little which calls for observation on the accounts which we present to you. They tell the familiar story of increased expenditure and higher prices; but we must bear in mind that neither the recent addition to the war wages nor the increase in the authorized price of coal have been felt to their full extent in the half year we are considering. On the receipt side of the revenue account, receipts for gas and meter and stove rental show an improvement of £49,158, owing to the price of gas being 3s. 6d. per 1000 c.ft., instead of an average of 2s. 10d. in the corresponding half of 1917. Residuals yield more by £10,455. On the other side of the account, coals and oil cost more by £34,742, and other costs of manufacture were £18,294 more—making the cost of the gas more by £53,036. Distribution charges were increased by £5236, and other unimportant variations reduced the expenditure by £2641; so that the total was more by £55,631. The receipts being more by £59,613, the balance of profit was larger by £3982.

NEW WAR PROFIT-SHARING SCALE.

There is one important item upon which I have not commented. I want to draw your attention to the item of profit-sharing bonus. The sum charged in this half-year's accounts is only £184, compared with £2488 last year. In the preceding half-year, it was £1475, compared with £2381 for the last half of the year 1916. That is for the last profit-sharing year which ended on June 30, the employees only received £1659, as against £4869 the previous year, and £7429 in 1913—the last pre-war year. Now that the price of gas has risen above 3s. 3d., the bonus (which is ½ p.ct. at that price, and varies by ½ p.ct. for every 1d. the price is increased above or reduced below 3s. 3d.) has disappeared altogether. It is not in the interests of the Company or of the consumers or shareholders that the bonus should cease altogether; and therefore, without any application on the part of the employees who have seen their bonus gradually diminishing to nothing without grumbling, the Directors have instituted a new scale, for the period of the war and a year or two afterwards, which will ensure the employees receiving a small bonus. This will have the effect of keeping alive the interest in the profit-sharing scheme, which has proved very helpful in the administration of the Company. I believe that this smaller bonus will be appreciated by the employees as a token of the Company's continued interest in their welfare.

NET REVENUE ACCOUNT.

The net revenue account sums up the result of the half-year's operations. We brought forward a balance of £40,102 of undivided profit. Adding the profit of the half year—£45,714—to that gives £85,816. Deducting the interest paid upon the Company's loans, which amounts to £15,859, leaves £69,957 available for dividend, which, at the rate of £3 12s. p.ct. per annum on the 4 p.ct. stock and of 3 p.ct. per annum on the 3½ p.ct. stock, amounts to £35,639, and leaves £34,318 to be carried forward to the current half year. I may point out here that the Company has reduced the balance of undivided profit during the war by no less than £45,251, all of which has gone to keep down the price of gas.

PROSPECTIVE INCREASE IN THE PRICE OF GAS.

I regret to say it will be necessary to again raise the price of gas at Michaelmas; but the Directors have not yet determined the amount of the increase. It will, however, bring the dividend payable upon both classes of the Company's stock below three-quarters of the standard rate; and it will therefore involve an application to the Board of Trade for relief under the new Statutory Undertakings (Temporary Increase of Charges) Act. We must look forward next half year to a dividend at the rate of 3 p.ct. upon the 4 p.ct. stock, and of £2 12s. 6d. upon the 3½ p.ct. stock.

EMPLOYEES ABSENT AND AT HOME.

I regret to say that six more of the Company's employees have given their lives for their country, bringing up the total loss from war causes to 34. We honour their sacrifice, and regard their memory with gratitude. May God comfort those whom they have left behind, and preserve our men who are still in the field. I desire to bear my testimony to the continued good work done by all classes in the Company's service; and in this connection, I would specially mention the women and bear testimony to the good feeling which exists between officers and workpeople. This is largely due to the cordial feeling and good management of Mr. Stanley H. Jones, our Engineer and General Manager.

The Deputy-Chairman (Mr. H. E. Jones) seconded the motion. From his special position in touch with the gas industry, he could say that the Company's misfortunes were widely shared, especially in the basin in the Thames, where coal was only brought by sea, instead of by rail, as was the case in the north of London, where the companies were only hit by the advance in the price of coal at the pithead, and some small additional charge for wagon hire. The companies who depended upon seaborne coal had been badly hit. In the Argentina the gas companies did not get any dividend at all. But on the Continent with unrestricted residuals sales, the dividends were paid out of the residuals and not out of the gas at all, though the authorities in France had been more liberal in the matter of the price of gas than was the case in this country. Both the railway and shipping interests by whom coal was conveyed were doing very well in the war. The railways were, as the Chairman had said, guaranteed their dividends; and the coal owners were guaranteed their profits before the war. Gas undertakings went very generously into the production of residuals which had been so vital in the prosecution of the war. The return for this had been to have all these things taken from them at pre-war prices. In every way they were working under restricted prices; and their dividends and profits had gone down in the manner the Chairman had so lucidly described He (Mr. Jones) now regretted that the organizations connected with the gas industry did not go earlier in the day, and insist on the valuable products of gas undertakings being paid for at a proper price.

Replying to Mr. S. M. Wood and Mr. Quartermaine,

The Chairman said the increase in wages did not realize the effect they sought by continuing the bonus. The number of stoves out on hire had increased, but the number of ordinary meters was less. The consumption of gas had decreased by about 4 p.ct. To a small extent the darkening of the streets had affected the consumption. But the authorities had electricity undertakings of their own; and they only gave the gas company the back streets—keeping the cream of the streets for themselves. As to whether the electricity paid, that was a question for the Councils and the ratepayers to answer.

The motion was unanimously carried.

The Dividends.

The Chairman moved, and the Deputy-Chairman seconded, the declaration of dividends for the half year at the following rates per annum: £3 12s. p.ct. on the 4 p.ct. stock, and 3 p.ct. on the 3½ p.ct. stock, less income-tax.

The motion was carried.

A Vote of Thanks.

On the proposition of Mr. Quartermaine, seconded by Mr. Rake, a hearty vote of thanks was passed to the Chairman and Directors, the Engineer and General Manager (Mr. Stanley H. Jones), the Secretary (Mr. F. J. Bradfield), their staffs, and the employees generally. Sympathy was expressed by the mover in the difficulties which the Directors and officers had had to encounter, and with which they were still faced.

The Chairman thanked the proprietors very sincerely for their kind vote. It was a great comfort to the Board and the officials to know that the proprietors appreciated their difficulties, and the services they tried to render. He was glad the proposer of the vote had included in it the staff and the workpeople, because one and all had toiled early and late for the welfare of the Company; and it was largely due to their efforts that the working results had been entirely satisfactory.

Mr. Stanley H. Jones, on behalf of his staff, workmen, and himself, acknowledged the vote. He remarked that they never needed the kind words of the proprietors more than now, because the position the Chairman had described was almost intolerable. While they had to do their ordinary work, they had also to answer innumerable questions, fill in returns, and obey orders from innumerable Government Departments. It was almost unbearable. However, they were deeply grateful for the sympathy accorded to them.

Mr. Bradfield, on behalf of the clerical staff, also acknowledged the vote. It was a great pleasure to them to have their efforts awarded such recognition by the proprietors. He must include the lady members of the staff. They had proved themselves very capable, although most of them had come to the Company without experience.

SOUTHPORT CORPORATION GAS ESTATE.

Annual Report.

The minutes of the Gas Committee submitted to the Southport Town Council on Tuesday last contained the report of Mr. John Bond, the Engineer and General Manager, for the year ended March 31 last.

The report showed an increase in gas consumption amounting to 15,670,800 c.ft., which is equivalent to 3 p.ct. as compared with last year's figures. The prepayment system now amounts to 18·88 p.ct. of the whole sale, and shows an increase of 0·51 p.ct. on last year. The average price received for all gas amounts to 2s. 8·65d. per 1000 c.ft. The total capital expended per 1000 c.ft. of gas sold was 11s. 4·94d., against 11s. 9·05d. for 1917. The capital outstanding per 1000 c.ft. of gas sold was 5s. 10·53d., against 6s. 3·02d. for 1917. The gross profits for the year amount to £13,825; and after paying £11,807 towards the interest and sinking fund, and contributing £2000 to the relief rates, there is a credit balance of £18 to be carried forward. The capital account (total amount expended) now stands at £307,080, and the gas-works debt, after deducting payments through the sinking fund, at £158,164. The gas-making material used was as follows: Coal, 47,260 tons (increase 3079 tons); oil, 618 tons (decrease 154 tons); coke for carburetted water gas, 1674 tons (decrease 786 tons). During the year, coal advanced; and the Committee had to pay 8s. 3d. per ton over the 1913-14 prices. The total increase in the cost of coal, labour, and other material was £32,000—equal to 3s. 2·3d. per 1000 c.ft. of gas sold.

With regard to residual products, Mr. Bond reports that the Admiralty require large quantities of fuel oil; and it has been necessary for him to conduct experiments in connection with carbonization on a working scale to produce the maximum amount of fuel oil from coal and cannel, and at the same time to maintain a normal make of gas per ton of coal and cannel carbonized. The experimental work in this direction has led to a large increase in fuel oils suitable for the Navy. During the time the department manufactured ammoniacal liquor the whole of the plant worked successfully and produced a liquor above the standard required by the Ministry of Munitions. Owing to the great demand for sulphate of ammonia, used chiefly for agricultural purposes, the Food Production Committee requested the department to manufacture ammonium sulphate instead of concentrated liquor, to enable them to meet the extra demand for this product. The department have therefore been manufacturing sulphate of ammonia of good quality since March 2 last.

The maximum and minimum makes of gas during twenty-four hours were 2,442,000 c.ft. and 1,059,000 c.ft. respectively. The number of gas-cookers in use at the end of the year was 10,061, against 10,110 for 1917. During the year, 56 new cookers and 359 gas-fires were fixed; also 55 new service pipes were laid, and 160 new meters fixed. The total number of meters in use at the end of the year was 20,299—an increase on the previous year of 50. The war pay of the department for the year amounted to £603.

On the motion of Alderman Trounson, an ex-Chairman of the Committee, consideration of the report was adjourned for a month.

Rhyl Stokers' Wages and Gas Prices Raised.—Yesterday week, the Rhyl District Council decided to increase the wages of the gas-works stokers by 7s. per week—making a rise of 16s. on pre-war wages. At the same meeting the Council agreed to raise the price of gas 2d. per 1000 c.ft., in consequence of the increased price of coal; but they refused to promote a Provisional Order enabling them to raise the price of gas beyond 4s. (the legal limit under their Act). It was remarked that if, under war conditions, the Council have managed to sell gas under 4s., there is no need to waste money on securing powers which they do not think will be required.

EXEMPTIONS FROM MEDICAL EXAMINATION.

The Ministry of National Service has issued the following notice regarding exemptions from medical examination:

Instructions have been given that men of the new military age who come within the terms of the List of Certified Occupations are not for the present to be called up for medical examination, the necessary consequence of which is that they are not called for military service, and need not make any application to tribunals. The list of certified occupations is now being revised; but it is proposed that, in general, the same provision should also extend to men of the new military age who are within the terms of the revised list. The object of this provision is to enable the older men who are engaged in a certified occupation to continue in that occupation; and in these cases it is therefore unnecessary and undesirable for men to change their occupation. Every care is taken that such men shall not be sent medical examination notices; but owing to the doubt as to the precise occupations of many men as shown in the National Register, some notices may be issued to men who should not receive them. In these cases, it is arranged that the notice will be cancelled provided the man returns it at once to the office of issue, and establishes his claim to be of the new military age and to be engaged in a certified occupation. If, however, the man does attend for medical examination and then applies to a tribunal for exemption, it is arranged that the National Service representative, on verification of the facts, will not oppose the application.

It is also intended that the continuance of important industrial, commercial, and professional undertakings and businesses should not be crippled by the withdrawal of men of the new military age who are in essential administrative positions in such businesses. Many of these men will probably not be called up for medical examination; but if they are so called, and are medically graded 1 (B 1) or 2 (B 2), they should prove the facts relating to their business fully before the Tribunal.

The notice also includes information as to war work volunteers.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *Aug.* 19.

The only product of interest in the London tar products market at the present time is pitch, which is still very firm at about 57s. 6d. net per ton at makers' works. All other products remain unchanged.

Sulphate of ammonia is still being delivered in large quantities under Government licences.

Tar Products in the Provinces.

Aug. 19.

The average values for gas-works products during the week were: Gas-works coal tar, 27s. to 31s. Pitch, East Coast, 30s. to 35s. per ton; West Coast—Manchester 25s. to 30s., Liverpool 25s. to 30s., Clyde 25s. to 30s. nominal. Benzol 90 p.ct., North, 10½d. to 11½d.; 50-90 p.ct., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha in bulk, North, 7¾d. to 8¼d. Solvent naphtha, naked, North, 3s 1d. to 3s. 2d. Heavy naphtha, North, 2s. 11d. to 3s. 1d. Creosote, in bulk, North, 4d. to 4¼d. Heavy oils, in bulk, North, 4¼d. to 5d. Carbolic acid, 60 p.ct. East and West Coasts, 2s. 6d. to 2s. 9d. naked, nominal. Naphthalene salts, £6 to £7, bags included. Anthracene, "A" quality, 4d. to 6d. per unit; "B" quality, 1½d. to 2d.

FROM A MARKET CORRESPONDENT.

Tar Products.

Markets are somewhat quiet at present, which is not an unusual condition at this time of the year. On the whole, however, prices remain fairly steady. Pitch may be considered a strong point; most London makers quoting quite 57s. 6d. per ton f.o.b., and in some quarters a further advance is looked for. There is room for greater improvement in Provincial rates. Business outside London is being held up to a certain extent by the difficulties created by railways in conveying pitch to London for shipment. Although attempts are being made to arrange shipments from Hull and Goole, they do not appear to be making much progress. Provincial prices are not really bad; for there has even been a tendency to ask more money in some centres—particularly Manchester. This may be due to hopes that transport facilities will shortly improve; and in this direction much may be done by united action between the manufacturers themselves. Heavy naphtha is rather scarce; but quotations do not change. On the other hand, solvent naphtha is not much inquired for, and is quoted at from 3s. 3d. to 4s. per gallon in London and 3s. to 3s. 6d. per gallon in Provincial centres. In one case, offerings were absorbed at 2s. 6d. per gallon; but dealers who can hold on until inquiries come along, and do not offer the product, can still make the first-named prices. Transport facilities, of course, also affect quotations in different centres. As regards naphthalenes, refined is quiet at late rates; but crudes are wanted at from £6 per ton for lowest qualities, up to £14 per ton for best sorts. Creosote, carbolic acid, toluol, and benzol are without change; but the control prices of the latter still remain matters of criticism in the trade. Benzol costs quite 2s. per gallon to produce under present conditions, against a mean selling price for the standard product of under 1s. per gallon. Existing conditions, however, seem to warrant at least 2s. per gallon for standard and 2s. 6d. for pure; but here, again, no amelioration is likely without united action. Carbolic 60's are still being quoted at 2s. 6d. per gallon—very

high prices being obtained for 40 p.ct. crystals—but an advance is likely, especially if export licences for crystals are still freely available. Cresylic acid remains at 3s. to 3s. 6d. per gallon, and other products are without change. It is announced that the number of tar distillation plants in operation in Great Britain exceeds 400, including dehydration plants. While this does not necessarily mean any increase in the output of crude tar, it does show that producers are endeavouring to advance their products to a more profitable degree. The range of quotations is as under:

Benzol: 90% London, 1s. 0½d., North 10½d. to 11½d.; 50% North 1s. 4d. to 1s. 5d. naked per gallon.

Carbolic Acid: 60% East and West Coast 2s. 6d. per gallon; crystals 40% 1s. 2d. per lb.

Crude Tar: London 32s. 6d. to 35s.; Midlands 27s. to 29s.; North 28s. to 30s. per ton *ex* works.

Pitch: London 57s. 6d. f.o.b. works; East Coast, 33s. f.o.b.; West Coast, 32s. to 33s. f.a.s.; Manchester, 32s. 6d. upwards; Clyde 32s. to 33s.; South Wales 42s.

Solvent Naphtha: London 3s. 3d. to 4s.; North and Midlands 3s. to 3s. 6d. per gallon.

Crude Naphtha: Naked 30% 8¼d. to 8½d.; North 6¼d. to 6½d.

Naphthalene: Refined £28 per ton nominal; salts 80s., bags included.

Toluol: Naked, London 2s. 4d.; North 2s. 3d.

Creosote: Nominal, London 4¼d.; North 4d. to 4¼d. (Government price, 75s. per ton f.o.b.—equal to 4⅜d. per gallon); heavy oil, 4½d. per gallon in bulk.

Anthracene: "A" quality, 40-45%, 4½d. per unit; "B" quality, 1¾d. to 2¼d.

Cresylic Acid: 95%, 3s. per gallon; 97-99%, 3s. 3d. to 3s. 6d. per gallon, casks included *ex* works London and f.o.b. other ports.

Grease Oils 18° Tw. (naked) £6 per ton f.o.r. makers' works.

Sulphate of Ammonia.

The quantity of ammoniacal liquor required for munitions and chemical industries is still increasing; and there is no change in the position of sulphate, which goes off as quickly as made—in fact, better than had been anticipated a little while ago. Supplies show no increase, and next season's demand is likely to be still greater. Production during the coming winter may be affected by the reduction of coal carbonized for lighting purposes; but this may be compensated for by an increase in coke-oven production. Very little is now being heard of synthetic processes; and the trade is somewhat curious as to what is taking place, both as to production and with regard to the economic position after the war.

The salary of Mr. William Prince, the Gas Engineer and Manager to the Tipton Urban District Council, has been advanced by £100 per annum.

Gas Poisoning at Belfast.—"Death due to asphyxia, following gas poisoning," was the verdict of a Belfast Coroner's Jury in the case of Rebecca Blackburn, who was found dead in her bedroom at lodgings in Ormeau Road. She had not been seen for three days; and the landlady on going to the bedroom found that the door was tied on the inside. An entrance was effected, when it was discovered that the gas-bracket was turned on and the room full of gas; while the woman lay dead on the bed. It was explained that deceased was not supposed to use the gas.

Gas and Tar Oil for Buses.—The London General Omnibus Company are going to make a start towards the end of the month with five of the gas-cylinder fitted omnibuses (of which as a beginning twenty are being constructed) on No. 16 route—Victoria to Cricklewood. According to the "Daily Telegraph," the Company have been experimenting with tar oil; but this was found unsuitable as a fuel on account of the smoke and smell. At the same time, it is thought that it might answer very well for ordinary commercial lorries, farm tractors, or anything of that description.

Serious Outlook at Warrington.—At last Tuesday's meeting of the Warrington Town Council, the General Manager of the gas undertaking reported that he had received notice from the Coal Controller that coals under certain contracts with the Corporation had been diverted to the supply of a private gas company. The Gas Committee resolved, and their recommendation was confirmed by the Council, that the works should be carried on by the use of coal out of stock. A letter of protest was addressed to the Coal Controller pointing out that the conditions imposed by him were unnecessary. It was pointed out by Alderman James Evans that the recent warnings of the Committee as to the possible curtailment of the supply of gas had caused considerable uneasiness to the authorities responsible for the management of the War Hospital at Winwick.

Increases in the Price of Gas.—Halifax gas prices are to be increased, from the last meter reading in September, by 10d. per 1000 c.ft., by ordinary meters, and rates by prepayment meter accordingly, bringing the price up to 4s. per 1000 c.ft. The Lymm (Cheshire) Urban District Council have approved a recommendation of the Gas Committee to raise the charges for gas for lighting to 4s. 7d. per 1000 c.ft.; cookers, 4s. 2d.; slot meters, 4s. 9d.—16 c.ft. for 1d., with a discount of 1d. in the 1s. The price of gas at Renfrew is to be increased by 8d. per 1000 c.ft. The present rate is 3s. 6d. for ordinary meters, and 3s. 10d. for prepayment meters. The South Normanton Gas Company announce that the price of gas is to be increased by 6d. per 1000 c.ft., making the price altogether 5s. 6d. At the Ulverston Urban District Council meeting on Tuesday last, it was decided that the price of gas be increased by 8d. per 1000 c.ft., to 4s. 5d., and that for prompt payment of accounts the discount be 1d. per 1000 c.ft., instead of 2½ p.t. At the last monthly meeting of the Wombwell Urban Council it was decided to advance the price of gas 6d. per 1000 c.ft.

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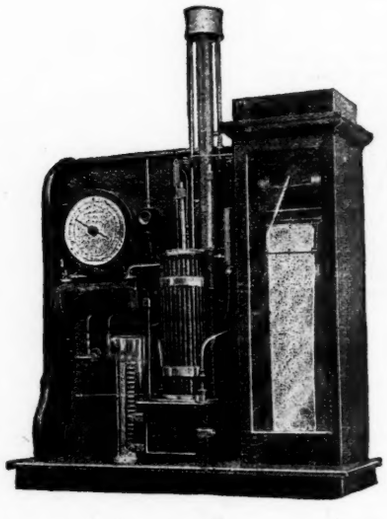

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Proposed Amalgamation of Carbide Companies.

Details of the proposal to amalgamate the interests of the Alby United Carbide Factories, Ltd., with those of the Nitrogen Products and Carbide Company, Ltd., were published officially during last week, says the "Chemical Trade Journal." The Alby Company was registered in 1905 as the Sun Gas Company; the title being changed in the following year. The capital, originally £25,000, is now £725,000. The Nitrogen Products Company was established in 1913; the capital being £2,000,000, in £1 shares (769,000 fully-paid and 1,231,000 with 17s. paid), of which 240,415 fully-paid and 259,620 partly-paid shares are held by the Alby Company. The Board of Directors is the same for each concern. Thus it will be seen that the interests of the Companies are already very closely interwoven. The scheme, if approved, will mean that every holder of fully-paid shares in the Nitrogen Products Company will receive one fully-paid new ordinary £1 share in the Alby Company. As regards the partly-paid shares in the former Company, a final call of 3s. per share will be made; but holders of such partly-paid shares will be given the option of paying up in full and receiving fully-paid new ordinary shares, or, alternatively, of receiving one new ordinary share in Alby United, with a liability thereon equal in amount to the unpaid liability on their shares in Nitrogen Products. It is proposed to capitalize and distribute a portion of the reserve of the Alby Company by allotting to each shareholder and paying up on his behalf one additional ordinary £1 share for every additional eight ordinary shares held by him. For this purpose, and for the purpose of providing the shares to be received by the shareholders of the Nitrogen Products Company, it is proposed to increase the capital of Alby United to £2,350,000, by the creation of 1,625,000 new ordinary shares of £1 each, ranking *pari passu* with existing ordinary shares.

Wigan and its Price for Gas.—The Wigan Corporation have decided to make application to the Board of Trade for permission to increase the price of gas for lighting, cooking, heating, and motive power purposes within and beyond the Wigan borough by 10d. per 1000 c.ft. as from Oct. 1. If the Board of Trade sanction the proposed increase, the price in the area supplied by the Corporation will be 77 p.ct. over and above the pre-war price.

Leatherhead Gas and Lighting Company.—The accounts of the Company for the year to June 30 (presented at the shareholders' meeting last Wednesday) show increased sales of gas from 85 to 105 millions. The receipts amounted to £29,885, and the working expenses to £25,216, leaving a profit of £4669. With the amount of £1780 brought from the previous year, there was a total of £6149 to dispose of. After deducting interest on loans, &c., also income-tax, and the interim dividend of 2½ p.ct. paid in February, there was a balance of £3249. The Directors recommended the payment of a final dividend of 3 p.ct. (making 5½ p.ct. for the year). This absorbed £1356, and left £1893 to be carried forward.

Industrial Reconstruction Council.

The report of this Council shows that, during the six months ending June, great progress has been made with the movement towards self-government for industry. It is now possible to say that there is general recognition on all hands of the need for organization. Trade associations are experiencing a great accession of membership; and workers are flocking into their trade unions. This strengthening of associations and unions is almost entirely due to the belief that joint bodies will be formed; and it is perhaps the most striking practical result of the work that is being done at the moment. The report proceeds: It may be said that there is no trade that is not discussing, if only in a preliminary or unofficial way, its relation to the Whitley report, and hardly any trade that has not accepted its underlying principles. The work of the Ministry of Labour in promoting Joint Standing Industrial Councils, and of the Ministry of Reconstruction in connection with Industrial Reconstruction Committees, appears to be reaching out over the whole range of industries; and the prospects of the early establishment of a general joint advisory system for Government purposes seem to be extremely bright. So far as the trades themselves are concerned, it is obvious that the driving force behind this movemnt is a feeling of the need for organization and co-operation with labour in order to gain strength for the work of the reconstruction period. In this connection the Council notices with regret a tendency among employers in certain quarters to restrict the function of joint bodies to what are known as "labour questions." These employers fail to realize, in the opinion of the Council, the added strength which they could secure by co-operation with labour in any future discussion as to Government activities in connection with their trade. The Council has issued a manifesto dealing with this point, and claiming that the Government should in all trading matters consult only joint bodies. If discussions are confined to labour questions," the main object of the Joint Industrial Councils will be sacrificed. There is still a great deal of work to be done in the education of the public as to the true needs of industry and the real functions of Industrial Councils; and this is work to which the Council are devoting their whole energies and attention.

Price of Gas at Arbroath.—It was reported to Arbroath Town Council at their last meeting that since the price of gas had been fixed for the current year the Coal Controller had increased the price of coal by 4s. per ton over and above that taken into account in the annual estimates. The increased price represented an additional charge of about £1969 against the current year's revenue. As the result of increased wages, the local carting contractors had also increased their charges for carting by 3d. per hour, which in the case of the Gas Committee represented an additional charge for carting of £125 for the current year. The Committee reported having agreed to defer making any recommendation with regard to the price until the September meeting of the Council.

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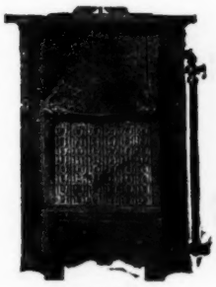

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Helensburgh Gas Supply.

The financial statement for year ended May 15 shows that the income amounted to £16,684; and the expenditure to £12,170—the gross profit thus being £4514. Upon the expenditure side the principal items were: Coals (at £1 2s. 8d. per ton), £6817; wages, £1782; maintenance of works and plant, £524; meters, £227; stoves, £456; rents, rates, taxes, insurance, and feu-duties, £598; general administration, £440; discounts, £318. On the income side the revenue from gas sales was £12,119; coke, £2675; tar and ammoniacal liquor, £902; stoves sold, £366; stove rentals, £388; sundry sales, £173. From the gross profit of £4514 there was paid: Interest on loans, £1052; instalment of loans repaid, £1000; sinking fund, £480; income-tax, £443. The net profit on the year's working was, therefore, £1518—equal to 4·8d. per 1000 c.ft. of gas sold. Adding £1220 brought forward at the beginning of year there is at the credit of the revenue account the sum of £2758. The amount standing at the credit of the depreciation fund is £1191. In sending these particulars, the Engineer and Manager of the Department (Mr. David Fulton) writes: The Council have fixed the prices of gas at the same figures as last year—viz., ordinary meters, 3s. 1½d. per 1000 c.ft., less discount; slot meters, 3s. 6½d. per 1000 c.ft.

Stourbridge Borough Gas Department.

The report by Mr. Charles H. Webb, M.Sc., A.M.Inst.C.E., the Engineer and Manager of the Stourbridge Gas-Works, has been issued for the year ended March 31 last. The gas manufactured was 15,850,000 c.ft. more than in the previous year. This increase was balanced by greater sales of gas to the extent of nearly 17,000,000 c.ft., and a reduction in the gas unaccounted for of over 1,000,000 c.ft. On revenue account, the expenses continued to increase; coal having been advanced in price by 2s. 6d. per ton in September last year, while the cost of all materials and wages was becoming steadily higher. On the other hand, the receipts have not risen at a corresponding rate, as the price of gas was only increased by 2d. per 1000 c.ft. for lighting purposes, and 4d. per 1000 c.ft. for power purposes, in the latter portion of the year. The increases compared with pre-war rates are now: Lighting, 6d. per 1000 c.ft., and prepayment supplies, 1⅜d. The residuals showed good returns—giving 70·18 p.ct. on the cost of coal and oil, as compared with 76·26 p.ct. last year. The balance carried to the profit and loss account was, therefore, reduced by £1193, and stands at £13,492. After making the usual deductions for annual instalments and interest, including income-tax, the surplus was £3485. Expenditure on new work is again very small, Mr. Webb remarks, owing to difficulty in obtaining material; but all repairs necessary to maintain the efficiency of the works have been executed. A calorific standard was granted by the Local Government Board, and oil-washing for benzol recovery was commenced. During the year 72 meters were fixed, 135 cookers, and 282 gas-fires, geysers, &c.

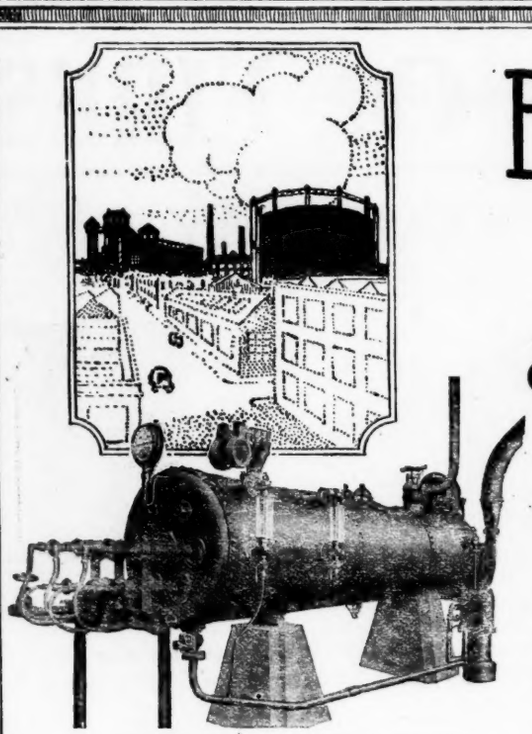
Gas Companies and Mechanical Traction on Public Roads.

The Main Roads Committee of the Southampton County Council report that by the Bill promoted this year by the Aldershot District Council it was proposed to obtain power to use mechanical power upon the tram road, and the Council at their meeting in February authorized the Committee to take such steps as might be necessary for the protection of the interests of the county in connection with this Bill. The Committee now report that, by agreement with the promoters, the following clause has been inserted in the Bill:

> **Notwithstanding anything contained in section 70 (Power to Make Tramroad) of the Act of 1909, the restriction under that section to animal power of the motive power upon the tramroad in the parish of Aldershot constructed under the powers of that Act shall apply only to so much of that tramroad as is laid on the level across the main road from Aldershot to Ash; and the Company may use upon the remainder of the said tramroad at the discretion of the Company animal or steam, electrical, or other mechanical power.**
>
> **Notwithstanding anything contained in the said section 70 or in this section, the Company may, with the consent of the County Council of Southampton (which consent may be given from time to time for such periods, and upon such terms and conditions, as that Council shall think fit, and may at any time be revoked), use upon the said level crossing steam, electrical, or other mechanical power in lieu of, or in addition to, animal power.**

The Committee recommend the Council to delegate to them their powers with regard to consenting to the use of the crossing by mechanical traction; and, subject to the adoption of the recommendation, they propose to consider what conditions it will be desirable to impose in connection with any consent to the use of mechanical traction.

Gas Supply at Silsden, Yorks.—According to the report of the Gas Engineer and Manager of the Silsden Urban District Council (Mr. A. F. Ames) there was last year an increase in the quantity of gas made of 261,000 c.ft. over the year 1916-17. The gas made averaged 12,202 c.ft. per ton of coal carbonized—this being the highest figures recorded since the start of the undertaking. These results were secured notwithstanding the great depreciation in the quality of the coal received compared with pre-war times. The total working expenses for the year were £4066; while the income was £5188, or an increase of £513. The gross profit on the year's working was equal to 10·43 p.ct. on a capital outlay of £10,750. After paying interest, sinking fund, and other charges of a capital nature amounting to £904, there was a net profit of £219, against a loss of £475 the previous year. The average price received for gas was 2s. 11·7d. per 1000 c.ft. against a pre-war price of 2s. 6d. Mr. Hill, in moving the adoption of the report, spoke in high terms of the excellent way in which the undertaking had been managed; the results obtained having exceeded their highest expectations.



Early delivery given of sizes for evaporating 250 to 3000 lbs. of steam per hour. These sizes are only 2 ft. diameter and vary in length from 4 ft. 6 in. to 21 ft.

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Gas Rates and Discount.—Last Thursday at the Bury (Lancs) Borough Police Court a point was raised as to the allowance of discount on the payment of a gas bill. A cheque posted on the morning of the last day the account was due for the allowance of discount was received the following day, and discount was claimed. This could not be allowed; and the Magistrates decided that the amount must be in the hands of the collector on the last day.

The Coal and Gas Rationing Order.—According to the "Sheffield Daily Telegraph" a conference of Yorkshire authorities was held recently to consider the "unreasonable and inequitable ration scale" for gas and electricity. A deputation is to visit the Coal Controller to discuss these matters. Whether they will achieve anything or not, our contemporary remarks, we do not know. "But we are not worrying. The scale is totally unworkable, and will have to be modified before the winter is over, though such modification may be refused now."

Drogheda Gas Prices.—The Drogheda Corporation have adopted a recommendation of the Gas Committee that the Irish Local Government Board be applied to for power to enable an increase to be made in the price of gas from 5s. 6d. to 6s. 6d. per 1000 c.ft, should necessity arise. The Mayor (Mr. W. T. Skeffington, J.P.) said the matter had been fully considered in all its bearings; but even if the Local Government Board agreed to grant powers, it did not follow that increases would be made at once. Mr. H. W. Saville, the Gas Manager, said there had been an increase of 5s. 7d. per ton in the price of coal, which might necessitate an increase in gas prices.

Newcastle (Staffs) Gas Undertaking.—The annual statement of accounts of the Newcastle-under-Lyme gas undertaking shows that there was a gross profit on the revenue account for the past year of £6026, as compared with £2995 the previous year—being an increase of £303. The sales of gas realized £13,941, compared with £11,407 the previous year, or an increase of £2534. There was also an increase of £1223 for sales of residual products. The net profit for the year was £1861, against a loss on the previous year's working of £1157. Deducting the amount standing to the debit of the profit and loss account on March 31, 1917, there was now a credit balance on the revenue account of £259.

Reduced Dividend at Taunton.—The report of the Directors of the Taunton Gas Company, submitted at the annual meeting last Tuesday, stated that the quantity of gas sent out last year was 128,624,000 c.ft.—an increase of 9,421,000 c.ft. over the previous year. Notwithstanding the greater output, the difficulties created by the war had resulted in a further very serious reduction in the profits. The amount available for dividend was £3257; and out of this the Directors recommended the payment of 5 p.ct. on the preference and consolidated A stocks, and 4¾ p.ct. on the other shares and stock. The dividends last year were 8 p.ct. Mr. Alfred J. Edwards, the Manager, in reply to a vote of thanks to the staff, said the outlook for the winter was very unsatisfactory; and, without severe economy, there was much danger of a considerable shortage of fuel everywhere.

Aldershot Lighting Company.—In pursuance of the provisions of the Aldershot Company's Act of this year the ordinary meetings will in future be held annually in February, unless otherwise determined by the proprietors. The Directors have declared a dividend at the rate of £5¾ p.ct. per annum on the "A" stock, £3⅞ p.ct. per annum on the "B" stock (rates in accordance with the sliding-scale), and £5 p.ct. per annum on the "C" consolidated stock, for the half year to June—all less income-tax.

Croydon Gas Company.—The one-hundred-and-forty-third half-yearly meeting of the Company will be held on Friday when the Directors will report that, as compared with the corresponding period of 1917, the sales of gas show a diminution of 2·42 p.ct. Last half year the number of consumers increased by only 6, that of stoves on hire decreased by 178, but 305 stoves were sold to consumers. A further increase in the price of gas was rendered inevitable; and it was advanced by 3d. per 1000 c.ft. as from the 1st ult. Arrangements were made for a much-needed reconstruction in No. 1 retort house; but the Government permit necessary for execution of the work has been refused. After providing for all fixed charges, there is £26,350 available for dividends at rates per cent. per annum of: A stock, 13¼; B and C stocks, 10½; D stock, 5; E stock, 10—all less income-tax. These will absorb £22,040, leaving a balance of £4310 to be carried forward.

Gas Workers' Wages at Tiverton.—At a recent meeting of the Tiverton Town Council, an application was received from the employees at the Corporation gas-works for an increase of wages and the 12½ p.ct. war bonus. The Council granted an increase of 8d. per shift, or 4s. 8d. per week. and shortened the twelve-hour shifts to eight hours. They intimated that they would not grant the 12½ p.ct. bonus; and that, if the men pressed for this, the Council would submit the case to arbitration. The men being persistent in their demands, the matter was referred to arbitration in London the week before last, when the men's representative applied to the Committee of Production for an award directing that the 12½ p.ct. bonus be paid to workers in gas undertakings at Tiverton, Torquay, Paignton, Brixham, and Exmouth, in addition to the substantial increases of wages granted them. His contention was that the bonus has been paid by order of the Committee to workers in certified gas undertakings at Exeter, Devonport, and other populous centres; and that it ought to be paid in the smaller places also. The Solicitor of the Torquay Gas Company stated the case for the gas undertakings, to the effect that the conditions in the smaller towns in Devonshire were different in many respects from those in larger places where gas undertakings are certified; that rents and living expenses in the smaller towns are cheaper; that the men are already paid above the recognized local rates of wages; and that if, in addition, a bonus is enforced it would press heavily on the consumers, and may also operate to the disadvantage of elderly and partially disabled workmen. The Arbitrators (Sir Wm. Mackenzie, Mr. White, and Mr. Barker) said they would give their decision later. [It has since been published—see *ante*, p. 353.]

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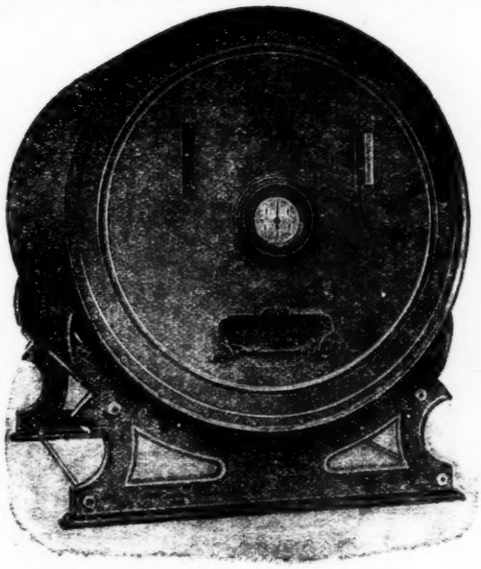

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STOCK MARKET REPORT.

THE week just concluded on the Stock Exchange was quite satisfactory and exempt from any disagreeable drawback. Business was rather quiet at first; but it quickened up later on, and towards the close it had become fairly active. The general tone was quite cheerful, aided by the unbroken series of successes to our arms on the Western front and, in a minor degree, in other quarters of the globe. Some realization of the profits to be secured from recently-advanced prices now and then occurred; but it did markets no harm—most of them closing very firm.

The gilt-edged market was in good case. Home Government issues showed strength; War Loans being in good demand, and Consols very steady. The favour to Indian issues continued. Home Rails were buoyant, and, after a mild attack of profit-snatching, made a prompt recovery.

Business in the Gas Market was more abundant in the aggregate; but the access of activity was largely the result of animated operations in certain lines. The feature of the week was the strong demand for undertakings working in France and other parts of the Continent. This was specially marked in Imperial Continental, which on Monday, after being done at 90, jumped by quick bounds to 106. It continued active throughout the week, and closed at 102-105. Continental Union advanced to 32 to 37, and marked top price on Friday. European was not dealt in; but the quotation was raised to 10 to 11. Apart from these, the general tendency showed a good improvement, and several of the quotations were advanced.

Bargains done for cash during the week were as follows: On Monday, Bournemouth preference 9½, Brentford "B" 67½, Commercial 4 p.ct. 60, Gas Light ordinary 62, 62½, 62⅞, 63, ditto maximum 52½, ditto preference 67⅞, 67⅞, Imperial Continental 90, 91, 92, 92½, 93, 94, 95, 95½, 96, Newcastle 67, Primitiva 29s. 6d., 30s., ditto preference 52s. 6d., 53s. 6d., South Metropolitan 67, South Suburban 69¾, 70. On Tuesday, Brentford "B" 66½, ditto preference 79. Gas Light ordinary 63, 63½, 64½, 64¾, Imperial Continental 100, 100½, 101, 103, 103½, 103¼, 104, 104½, 104⅛, 104¾, 105, Metropolitan of Melbourne 96¾, South Metropolitan 66, 66½, 67½. On Wednesday, Brentford debenture 62½, Continental Union 35, Gas Light ordinary 64½, ditto debenture 55¼, Imperial Continental 103, 103½, 104, 104½, 104¾, 105, Primitiva preference 54s., 55s., San Paulo 7⅞, South Metropolitan 66, 66¼. On Thursday, Gas Light ordinary 64, 64⅛, 64¾, ditto maximum 52, 52½, 52⅞, Imperial Continental 102, 103½, 104, 104½, 105, Monte Video 8⅜, 8⅞, Primitiva 29s. 6d., 30s. 3d., ditto preference 54s., 55s., South Metropolitan 65¾, 67, 67½, Bristol 80¾. On Friday, Alliance and Dublin 54, Commercial debenture 53. Continental Union 37. Gas Light preference 68, Imperial Continental 102½, 103, 103½, 103⅞, 104, Monte Video 9. Primitiva 30s. 6d., ditto preference 54s. 3d., South Metropolitan 65½, 66, Wandsworth 3 p.ct. debenture 48½, ditto 4 p.ct. debenture 62, Durham City 10 p.ct. maximum £14, £14 1s. 6d., Southend 5 p.ct. "B" 70.

In the Money Market, rates continued easy. The Bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Share.	When ex-Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
182,049	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	55—60	..
1,551,868	"	April 8	2½	4⅜	Alliance & Dublin Ord.	59—64	55—60*	54
874,000	"	July 10	4	4%	Do. 4 p.c. Deb.	76—79	57—62	..
280,000	5	April 29	7½	8%	Bombay, Ltd.	5⅞—6⅛	5—5½	..
50,000	10	Feb. 26	16	18%	Bourne- 10 p.c.	29—30	21—26	..
888,110	10	"	7	7%	mouth Gas B 7 p.c.	15—15½	10½—11	..
115,000	10	"	6	6/-	and Water Pref. 6 p.c.	13½—14	9½—93	9½
159,740	—	—	—	4%	4 p.c. Deb.	..	66—68	..
992,045	Stk.	Feb. 26	14	14%	Brentford A Consolid.	261—266	73—76	..
734,920	"	"	11	11%	Do. B New	204—209	65—68	66½—67½
55,000	"	"	5	5%	Do. 5 p.c. Pref.	109—111	77—82	79
221,400	"	June 11	4	4%	Do. 4 p.c. Deb.	91—93	62—64	62½
217,380	"	Feb. 26	11	9%	Brighton & Hove Orig.	208—218	135—140	..
244,200	"	"	8	6%	Do. A Ord. Stk.	154—159	95—100	..
530,000	20	Mar. 26	15½	22/6	British	44—45	30—31	..
120,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk.	88—90	64—66	..
245,771	"	"	4	4%	Buenos Aires 4 p.c. Deb.	85—87	60—63	..
100,000	10	—	—	—	CapeTown & Dis., Ltd.	1½—2½	3⅜—4½	..
100,000	10	—	—	4%	Do. 4½ p.c. Pref.	4—6	7—8	..
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	60—65	..
157,150	"	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	79—81	..
1,518,280	"	Feb. 12	5/9/4	36/-†	Commercial 4 p.c. Stk.	106—108	67—69	60
560,000	"	"	5½	30/-†	Do. 5½ p.c. do.	103—105	64—69	..
475,000	"	June 11	8	8%	Do. 3 p.c. Deb. Stk.	69½—71½	51—53	53
800,000	"	"	4	—	Continental Union Ltd.	76—79	32—37	35—37
200,000	"	"	7	—	Do. 7 p.c. Pref.	115—118	57—62	..
278,400	—	—	—	10½%†	Croydon B and C 7 p.c.	..	150—160	..
—	—	—	—	10%	Do. E	..	..	..
492,270	Stk.	—	6	6⅜%	Derby Con. Stk.	123—125	95—100	..
55,000	"	—	4	4%	Do. Deb. Stk.	102—104	80—83	..
1,002,180	10	July 29	10	5/0	European, Ltd.	17½—18	10—11	..
16,998,975	Stk.	Feb. 10	4/17/4	99/4	Gas 4 p.c. Ord.	98—102	63—65	62—64⅜
2,600,000	"	"	8½	8½%	Light 8½ p.c. max.	76—79	52—54	52—52¾
4,062,285	"	"	4	4%	and 4 p.c. Con. Pref.	96—99	66—68	67⅜—68
4,674,850	"	June 11	8	8%	Coke 5 p.c. Con. Deb.	72½—74½	54—56	55½
130,000	"	"	10	10%	10 p.c. Bonds	..	..	..
268,740	"	Mar. 12	5	8¾%	Hastings & St. L. 8½ p.c.	87—89	46—51	..
70,000	10	April 29	11	6%	Hongkong & China, Ltd.	16½—16⅝	7—8	..
86,600	—	—	—	9⅜%	Hornsey 7 p.c.	..	115—125	..
121,000	Stk.	Mar. 12	7½	7%	Ilford A and C.	151—154	90—95	..
65,780	"	"	6⅜	6⅜%	Do. B	115—118	70—75	..
65,500	"	June 26	4	4%	Do. 4 p.c. Deb.	92—94	62—65	..
4,940,000	"	May 14	9	4½%	Imperial Continental	150—160	102—105	90—106
1,235,000	"	Feb. 12	8½	8½%	Do. 8½ p.c. Deb. Red.	84—86	66—68*	..
235,942	"	Mar. 12	6⅜	6½%	Lea Bridge Ord. 5 p.c.	119—121	92—97	..
2,498,905	"	Feb. 26	10	5%	Liverpool 5 p.c. Ord. A	211—213	82—84	..
					B	146—148		
906,088	"	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	71—73	..
75,000	5	June 11	6	2/-	Malta & Mediterranean	4⅛—4⅝	3½—3⅝*	..
250,000	100	April 1	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	99—101	88—99	96⅜
541,920	20	May 26	4	6/-	Monte Video, Ltd.	11½—12	8⅜—9½	8⅜—9
1,875,892	Stk.	July 29	4½	8½%	Newcastle&Gatsh'd Con.	96½—99½	67½—68½	67
532,705	"	June 26	8½	8½%	Do. 8½ p.c. Deb.	82—83	59—61	..
55,940	10	Feb. 26	7/14/0	7½	North Middlesex 7 p.c.	14—15	9½—10½	..
900,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	101—103	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7⅝	6—4	..
60,000	50	Feb. 26	13	9%†	Porisea, Island B	125—131	80—85	..
100,000	50	"	12	8%†	Do. C	118—121	75—80	..
52,000	50	"	10	6%†	Do. D	..	..	..
949,980	5	April 29	8	—	Primitiva Ord.	5⅝—6	1⅜—1⅝	29/6—30/6
499,960	5	June 26	5	2/6	Do. 5 p.c. Pref.	4⅜—5	2⅜—2⅝	52/6—55/-
521,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91—93	75—77	..
—	—	—	—	4%	Do. " 1911	..	53—58	..
346,198	Stk.	June 26	4	4%	River Plate 4 p.c. Deb.	85—87	55—60	..
150,000	10	May 14	6	6/-	San Paulo 6 p.c. Pref.	10½—11	7½—7⅝	7⅜
135,000	50	July 1	5	5%	5 p.c. Deb.	47—49	40—42	..
135,000	Stk.	Mar. 12	10	10%	Sheffield A	228—234	..	..
209,984	"	"	10	10%	Do. B	222—224	174—177	..
538,500	"	"	10	10%	Do. C	220—222	..	..
90,000	10	May 28	9	6/-	South African	10½—11½	10—11	..
6,609,895	Stk.	Feb. 10	5/4/0	32/-	South Met. 4 p.c. Ord.	111—113	65—67*	65½—67½
250,000	"	July 12	—	5%	Do. Pref.	..	91—93	..
1,895,445	"	July 10	8	8%	Do. 3 p.c. Deb.	72½—74½	53—55	..
224,820	"	Feb. 26	8½	6%	South Shields Con. Stk.	157—159	121—123	..
952,795	"	"	6	3¾%	S'th Suburb'n Ord. 5 p.c.	114—116	68—70*	69½—70
60,000	"	"	5	5%	Do. 5 p.c. Pref.	110—112	72—74*	..
135,000	—	—	—	3½%	Do. West Kent	..	..	..
187,558	Stk.	June 26	5	5%	Do. 5 p.c. Deb. Stk.	116—118	82—84	..
647,740	"	May 14	5	3%	Southampton Ord.	99—102	74—76	..
120,000	"	Feb. 12	7½	5½%	Tottenham A 5 p.c.	135—138	88—93*	..
782,275	"	"	6	4%	District B 3½ p.c.	115—117	64—66*	..
181,255	"	June 26	4	4%	4 p.c. Deb.	87—89	61—63	..
182,380	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
286,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	103½—109½	87—88	..
					Wandsworth, Wimbledon, and Epsom—			
80,000	"	Feb. 26	8⅜	67/6	Wandsworth A 5 p.c.	151—156	90—95	..
256,636	"	"	6¾	52/6	Do. B 3½ p.c.	129—134	70—75	..
108,075	"	"	5/17/3	47/3	Do. C 3½ p.c.	110—115	70—75	..
352,000	"	"	6¾	46/3	Wimbledon 5 p.c.	117—122	70—75	..
98,000	"	"	6⅜	52/6	Epsom 5 p.c.	121—126	70—75	..
88,416	"	June 26	3	3%	3 p.c. Deb. Stk.	66—69	48—51	48½

* Ex Div. † Next Dividend will be at this rate.

Rivers Pollution from Gas-Works.—The Middlesex County Council Rivers Committee report that the New Southgate Gas-Works have recently installed a new filtering plant, which has considerably improved their effluents. Intermittent pollution, it is asserted, takes place from both the Hornsey and the Tottenham and Edmonton Gas-Works; and the cases are being dealt with by the Committee.

A Loss at Goole.—Despite the advance in the price of gas, the gas-works undertaking of the Goole Urban Council made a loss of £832 upon last year's working. This brings the loss on the past three years, due solely to war conditions, to £5150. It is stated the manufacturing price of gas is now 1s. 9d. per 1000 c.ft. The price to the consumer has been increased from 3s. to 4s.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

LADY FOR ADVISORY WORK AND CHARGE OF SHOW-ROOM. Darlington Gas Department.
SUPERINTENDENT. Coventry Corporation. Aug. 24.
CHEMIST AND DRAUGHTSMAN. Aldershot Gas, &c., Company.
WORKS MANAGER (Gas Meter Company). No. 6484.
CARBONIZING FOREMAN. Warrington Gas-Works.
DRAUGHTSMAN. No. 6476.
GAS FITTER AND PLUMBER. Culling, Weston-super-Mare.

Plant, &c. (Second Hand) for Sale.

AMMONIA PLANT.—R. Sizer, Ltd., 82, Mark Lane, E.C. 3.

Meetings.

HARROW AND STANMORE GAS COMPANY, No. 5, Great Winchester Street, E.C. Sept. 2, 3.30 o'clock.
HORNSEY GAS COMPANY, No. 5, Great Winchester Street, E.C. Sept. 6, 2.30 o'clock.

Meetings (*Continued*).

NORTH MIDDLESEX GAS COMPANY, No. 5, Great Winchester Street, E.C. Sept. 9, 2.30 o'clock.
SOUTHGATE AND DISTRICT GAS COMPANY, No. 5, Great Winchester Street, E.C. Sept. 5, 3.45 o'clock.

TENDERS FOR

Tar.

MANSFIELD GAS AND WATER DEPARTMENT. Tenders by Aug. 28.

R. & J. DEMPSTER, LTD., 34, Victoria St., S.W. 1. MANCHESTER.
& COAL WASHER.
HEAD, WRIGHTSON, & CO., LD. SOLE MAKERS OF THE